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Environmental Assessment
ES-020-2018-05

EOI #2277, LaFourche Parish, Louisiana
Lease EA

March 26, 2018

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ACRONYMS AND ABBREVIATIONS

APD	Application for Permit to Drill
APLIC	Avian Power Line Interaction Committee
AQI	Air Quality Index
BCC	Birds of Conservation Concern
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
BMP	Best Management Practices
C°	Celsius
CAIR	Clean Air Interstate Rule
CDPHE	Colorado Department of Public Health and Environment
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CFR	Code of Federal Regulations
CH_4	Methane
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_{2e}	Carbon Dioxide equivalent
COA	Condition of Approval
CSU	Controlled Surface Use
CWA	Clean Water Act
°F	Fahrenheit
dB	Decibel
dBA	A-weighted decibel
DOI	(U.S.) Department of the Interior
E	East
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EOI	Expression of Interest
ES	Executive Summary
ESA	Endangered Species Act
Et al.	Latin phrase et alia meaning "and others"
Et seq	Latin phrase et sequentes meaning "and the following"
FLPMA	Federal Land Policy and Management Act
FONSI	Finding of No Significant Impact
FOOGLA	Federal Onshore Oil and Gas Leasing Reform Act
GHG	Greenhouse Gas
GIS	Geographic Information System
GWP	Global Warming Potential
H_2S	Hydrogen Sulfide
HAP	Hazardous Air Pollutant
HFC	Hydrofluorocarbon
HV	High-Volume
IM	Internal Memo
IPCC	Intergovernmental Panel on Climate Change
LA	Louisiana
LDEQ	Louisiana Department of Environmental Quality
LDNR	Louisiana Department of Natural Resources
LDNROC	Louisiana Department of Natural Resource, Office of Conservation
LNHP	Louisiana Natural Heritage Program
LSU	Louisiana State University

MBTA	Migratory Bird Treaty Act
MLA	Mineral Leasing Act
MOU	Memorandum of Understanding
N	North
NAAQS	National Ambient Air Quality Standards
Nb	Non-breeding
NEPA	National Environmental Policy Act
NGVD	National Geodetic Vertical Datum
NHPA	National Historic Preservation Act
N_2O	Nitrous Oxide
NO_x	Nitrogen Oxides (generic for air pollutants – NO and NO_2)
NO	Nitrogen Oxide
NO_2	Nitrogen Dioxide
NRCS	Natural Resources Conservation Service (USDA)
NRHP	National Register of Historic Places
NSO	No Surface Occupancy
NWR	National Wildlife Refuge
O_3	Ozone
Pb	Lead
PFC	Perfluorocarbon
PL	Public Law
$PM_{2.5}$	Particulate Matter
PM_{10}	Particulate Matter
PPB	Parts per Billion
PPM	Parts per Million
PSD	Prevention of Significant Determination
RCRA	Resource Conservation Recovery Act
RFD	Reasonably Foreseeable Development
ROW	Right of Way
S	South
SEC	Section
SF	Sulfur Hexafluoride
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SMZ	Streamside Management Zone
SO_2	Sulfur Dioxide
SOP	Standard Operating Procedure
SPCC	Spill Prevention Control and Countermeasure
STAR	(EPA's) Science to Achieve Results program
Std	Standard
Tg	Metric Ton
TCP	Traditional Cultural Property
THPO	Tribal Historic Preservation Officer
T.R.S.	Township, Range, Section
US	United States
USACE	United States Army Corp of Engineers
USC	United States Code
USDA	United States Department of Agriculture
USDI	United States Department of Interior
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VOC	Volatile Organic Compound

W	West
WA	Wilderness Area
WMA	Wildlife Management Area
WO	Washington Office

EXECUTIVE SUMMARY

Proposed Action. The Proposed Action is to lease 5.56 acres of federal minerals located in LaFourche Parish, Louisiana for potential future oil and gas development. The lease parcel evaluated as part of the Proposed Action consists of federal mineral estate underlying private surface and is assigned Expression of Interest (EOI) #2277. The proposed lease would provide the lessee exclusive rights to explore and develop oil and gas reserves on the lease, but does not in itself authorize surface disturbing activities at this stage. Although there would be no surface disturbance from the action of leasing, this Environmental Assessment (EA) analyzes a reasonably foreseeable development (RFD) scenario to address the anticipated environmental effects from potential future oil and gas development that are considered reasonably foreseeable, but unknown in specific detail at this time. Before a lease owner or operator conducts any surface disturbing activities related to the development of this lease to access the federal minerals, the Bureau of Land Management (BLM) must first approve an application for permit to drill (APD) as specified in Title 43 Code of Federal Regulations (CFR) 3162. In an APD, an applicant proposes to drill the well subject to the terms and conditions of the lease. Upon receipt of an APD, the BLM conducts an onsite inspection with the applicant and preferably, the private landowner or surface management agency. The BLM would also conduct additional site-specific analysis in compliance with the National Environmental Policy Act (NEPA) and the appropriate consultations prior to approving the APD. The RFD scenario projects approximately 6.97 acres of surface disturbance from potential future oil and gas development associated with the proposed leasing action. All anticipated surface disturbance during future development would occur within the larger, state-determined drilling and production unit area but not on the lease parcel itself.

Purpose and Need. The purpose of the Proposed Action is to support the development of oil and natural gas resources that are essential to meeting the nation's future needs for energy while minimizing adverse effects to natural and cultural resources. The BLM minimizes adverse effects to resources by identifying appropriate lease stipulations and notices, best management practices, and mitigations. It is the policy of the BLM as mandated by various laws, including the Mineral Leasing Act of 1920, as amended (30 United States Code [USC] 181 et seq.), the Federal Land Policy and Management Act of 1976 (FLPMA), and the Energy Policy Act of 2005 to make mineral resources available for development to meet national, regional, and local needs. The oil and gas leasing program managed by the BLM encourages the sustainable development of domestic oil and gas reserves which reduces the dependence of the United States on foreign sources of energy as part of its multiple-use and sustainable yield mandate.

The leasing of federal minerals is vital to the United States oil and gas industry as it seeks to maintain adequate domestic production of this strategic resource. The industry uses the BLM EOI process to nominate federal minerals for leasing. The Proposed Action is therefore needed to respond to EOI #2277, consistent with the BLM's mission and requirement to evaluate nominated parcels and hold quarterly competitive lease sales for available oil and gas lease parcels.

Environmental Impacts. The anticipated environmental impacts of the Proposed Action and No Action Alternative are summarized in Table ES-1.

Table ES-1: Summary of anticipated environmental effects.

Resource	No Action Alternative	Proposed Action
Land Use	No impacts. Would result in the continuation of the current land and resource uses.	No direct impacts from leasing. Minor, short and long term changes to land use from reasonably foreseeable development activities due to conversion of undeveloped areas to areas that support potential future oil and gas development.
Noise/Visual Resources	No impacts. Would result in the continuation of the current land and resource uses.	No direct impacts from leasing. Minor, short and long term adverse noise and visual impacts possible from reasonably foreseeable development associated with the lease parcel. Noise levels would lessen during the production phase.
Socioeconomics and Environmental Justice	Loss, reduction, or delay of revenues generated through leasing and royalties.	Leasing would generate revenues that would be shared with counties. Reasonably foreseeable development may generate additional royalties, economic stimulation in the form of additional employment, output, and support services. Environmental justice concerns are not expected.
Cultural Resources and Native American Interests	Would result in the continuation of the current land and resource uses. Potential impacts from "relic hunting", bulldozing, etc.	No direct impacts from leasing. Future surveys or consultation under the National Historic Preservation Act (NHPA) may be required at the APD stage.
Mineral Resources	No impacts. Would result in the continuation of the current land and resource uses.	No direct impacts from leasing. Use and depletion of the resource would occur from reasonably foreseeable development.
Wastes	No impacts. Would result in the continuation of the current land and resource uses.	No direct impacts from leasing. Wastes would be generated from reasonably foreseeable development, with a potential for short and long term adverse impacts if wastes are not properly handled, stored, and disposed. Standard operating procedures (SOPs), best management practices (BMPs), and conditions of approval (COAs) at the APD stage would minimize risk from spills.

Resource	No Action Alternative	Proposed Action
Air Quality	No impacts. Would result in the continuation of the current land and resource uses.	No direct impacts from leasing. Short and long term impacts due to emissions from construction equipment and fugitive dust from reasonably foreseeable development.
Climate and Climate Change	No impacts. Would result in the continuation of the current land and resource uses.	No direct impacts from leasing. The proposed lease may contribute to the installation and production of new wells, which may consequently lead to an increase in greenhouse gas (GHG) emissions.
Soils	No impacts. Would result in the continuation of the current land and resource uses.	No direct impacts from leasing. Potential for minor adverse impacts to soils from future reasonably foreseeable development associated with clearing, filling, and grading activities.
Water Resources – Surface and Groundwater, Floodplains, Riparian Areas, and Wetlands	No impacts. Would result in the continuation of the current land and resource uses.	No direct impacts from leasing. Potential for minor adverse impacts to water resources located within the state-determined drilling and production unit area containing the parcel from future reasonably foreseeable development. SOPs, BMPs, and COAs at the APD stage would minimize risk to groundwater and surface water from spills.
Natural Resources (Wildlife and Vegetation, Invasives/Exotics, Special Status Species, Migratory Birds)	No impacts. Would result in the continuation of the current land and resource uses.	No direct impacts from leasing since there would be no surface disturbing activities. Potential for minor adverse impacts to wildlife and vegetation associated with reasonably foreseeable development associated with clearing for wellpad and road construction due to habitat loss and modification. No adverse impacts to threatened or endangered species, or habitat suitable for these species, are anticipated. Other wildlife species, including migratory birds, would experience loss of habitat and potentially direct disturbance impacts from reasonably foreseeable future development. These impacts are not expected to cause population level impacts to any species, including migratory birds.

Resource	No Action Alternative	Proposed Action
Public Health and Safety	No impacts. No action would result in the continuation of existing public health and safety conditions.	No direct impacts from leasing since there would be no surface disturbing activities. Potential future mineral development could result in exposure to contamination that may result in health conditions in sensitive or susceptible populations. However, federal, state, and local regulations, as well as health standards and protocols ensure that potential operations do not compromise public health and safety.
Cumulative Impacts	No impacts. Would result in the continuation of the current land and resource uses.	Negligible to minimal cumulative impacts are anticipated.

1.0 CHAPTER 1 – PURPOSE OF AND NEED FOR THE PROPOSED ACTION

1.1 Introduction

The Bureau of Land Management (BLM) has prepared this Environmental Assessment (EA) to evaluate the anticipated environmental impacts of leasing 5.56 acres of federal mineral estate to support potential future oil and gas development in LaFourche Parish, Louisiana (Figure 1-1). Interested parties such as private individuals or companies may file Expressions of Interest (EOIs) to nominate parcels for competitive bid and leasing by the BLM. The BLM Eastern States is required to hold quarterly competitive lease sales to sell available oil and gas lease parcels.

The parcel evaluated as part of the Proposed Action consists of federal mineral estate underlying privately owned land. A federal lease is a legal contract that grants exclusive rights to the lessee to develop federally-owned oil and gas resources but does not authorize surface-disturbing activities or obligate the lessee to drill a well on the parcel in the future. Should the parcel be leased and a detailed plan for oil and gas development on the parcel be identified, the BLM would conduct future site-specific environmental analysis prior to any ground disturbing activities. The Proposed Action evaluated in this EA is described in further detail in Chapter 2.

This EA has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969; the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508), the United States Department of the Interior (DOI) NEPA requirements (Department Manual 516, Environmental Quality) and the BLM NEPA Handbook H-1790-1. The information presented within this document serves as the basis for the BLM Authorized Officer to decide whether implementation of the Proposed Action would result in a significant impact to the environment. If significant impacts are expected, then the BLM would prepare an Environmental Impact Statement (EIS). If no significant impacts are expected, the BLM would issue a Finding of No Significant Impact (FONSI).

1.2 Location of the Proposed Action

EOI #2277 is located in LaFourche Parish, Louisiana and contains 5.56 acres. The proposed project site is located at: T. 15S., R. 16E., Sec. 153 (Figure 1-1).

1.3 Purpose of and Need for the Proposed Action

The purpose of the Proposed Action is to support the development of oil and natural gas resources that are essential to meeting the nation's future needs for energy, while minimizing adverse effects to natural and cultural resources. The BLM minimizes adverse effects to resources by identifying appropriate lease stipulations and notices, best management practices, and mitigations. It is the policy of the BLM as mandated by various laws, including the Mineral Leasing Act of 1920, as amended [(30 United States Code [USC] 181 et seq.), the Federal Land Policy and Management Act of 1976 (FLPMA), and the Energy Policy Act of 2005 to make mineral resources available for development to meet national, regional, and local needs. The oil and gas leasing program managed by the BLM encourages the sustainable development of domestic oil and gas reserves which

reduces the dependence of the United States on foreign sources of energy as part of its multiple-use and sustainable yield mandate.

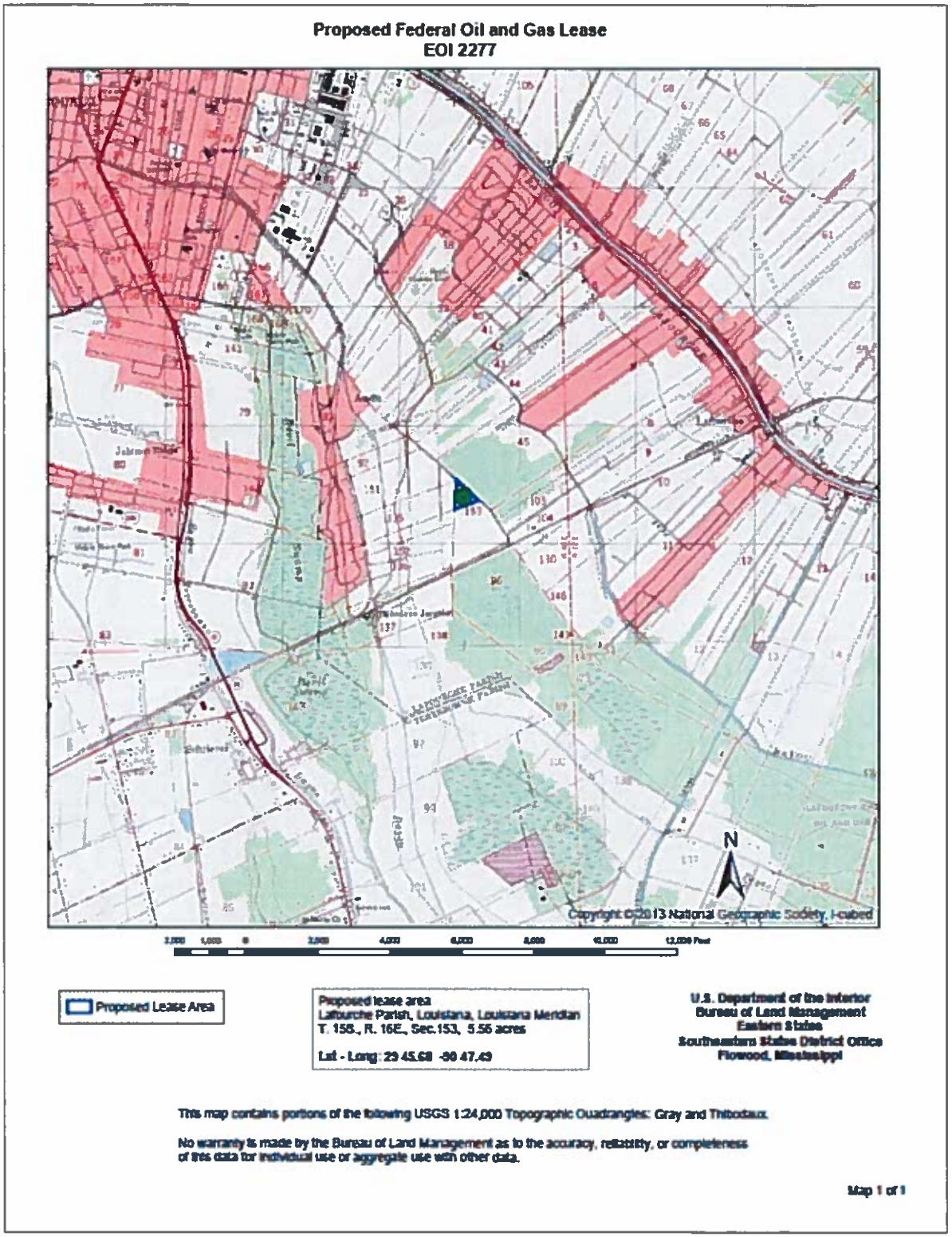

Figure 1-1. Topographic map of EOI #2277.

The leasing of federal minerals is vital to the United States oil and gas industry as it seeks to maintain adequate domestic production of this strategic resource. The industry uses the BLM EOI process to nominate federal minerals for leasing. The Proposed Action is therefore needed to respond to EOI #2277 consistent with the BLM's mission and requirement to evaluate nominated parcels and hold quarterly competitive lease sales for available oil and gas lease parcels.

1.4 Land Use Plan Conformance

The Proposed Action does not conflict with any known state or local planning or zoning law, regulation, policy or ordinance. The proposed lease area in Louisiana is not covered by a BLM Resource Management Plan; however, according to the regulations at 43 CFR 1610.8 (b) (1), this EA will be used as a basis for making a decision on the Proposed Action.

1.5 Relationship to Statutes, Regulations, and Other Plans

In addressing environmental considerations of the Proposed Action, the BLM is guided by relevant statutes (and their implementing regulations) and Executive Orders that establish standards and provide guidance on environmental and natural resources management and planning. These include but are not limited to the following:

- NEPA (1969) and the associated Council on Environmental Quality regulations at 43 CFR Parts 1500-1508
- FLPMA (1976) as amended and the associated regulations at 43 CFR Part 1600
- Mineral Leasing Act (MLA) (1920), as amended and supplemented (30 USC 181),
- National Historic Preservation Act (NHPA) (1966) as amended and the associated regulations at 36 CFR Part 800
- American Indian Religious Freedom Act
- Native American Graves Protection and Repatriation Act
- Endangered Species Act (ESA) (1973) as amended
- Clean Water Act (CWA) (1977)
- Clean Air Act (1970) as amended
- Federal Onshore Oil and Gas Leasing Reform Act (FOOGLA)
- Migratory Bird Treaty Act (MBTA) (1918)
- Resource Conservation and Recovery Act (RCRA) (1976) as amended
- Executive Order (EO) 11988- Floodplain Management
- EO 119900 – Protection of Wetlands
- EO 12898 – Environmental Justice in Minority Populations and Low-Income Populations
- EO 13007 – Indian Sacred Sites
- Oil and Gas Leasing Reform – Land Use Planning and Lease Parcel Reviews (BLM WO IM 2010-117)

1.6 Decision to be Made

The BLM's policy is to promote oil and gas development if it meets the guidelines and regulations set forth by NEPA and other subsequent laws and policies of the United States. Therefore, the

BLM must decide whether to lease the nominated parcel and if so, under what terms and conditions (Appendix A contains the proposed lease stipulations).

1.7 Scoping and Public Involvement

1.7.1 Internal Scoping

A BLM interdisciplinary team consisting of a Land Law Examiner, Planning and Environmental Coordinator, Planning and Environmental Specialist, Geologist, GIS Specialist, and Archaeologist reviewed the EOI and prepared the EA. The interdisciplinary team used various sources of information to prepare the EA, including existing data inventories, online resources, and information collected onsite. Documentation of the physical characteristics of the site and collection of information of baseline site conditions were based on aerial imagery, United States Geologic Survey (USGS) topographic mapping, and verbal land descriptions from the landowner on January 16, 2018. No major issues of concern were identified during internal scoping.

1.7.2 External Scoping

The BLM conducted and completed the required informal consultation with the United States Fish and Wildlife Service (USFWS) in compliance with the ESA Section 7 consultation requirements. The BLM also conducted and completed the required consultation with the Louisiana State Historic Preservation Office (SHPO) and Native American tribes. The BLM initiated informal consultation with USFWS on January 19, 2018. A stamped signature of no-effect concurrence on the first page of the consultation document was received on February 16, 2018 and is located in Appendix B. Consultation with the SHPO and coordination with the tribes occurred on January 23, 2018. The BLM received a concurrence letter from SHPO on April 9, 2018 (Appendix B).

Responses were received from three (3) tribes from January 25, 2018 to February 24, 2018. The Muscogee (Creek) Nation responded on January 25, 2018. They noted that the parcel did not lie within their area of interest and respectfully deferred to other contacted tribes. The Jena Band of Choctaws responded on February 15, 2018. The Tribal Historic Preservation Office (THPO) was unaware of any Traditional Cultural Property (TCP) presence on the parcel but noted TCP presence within a one (1) mile radius and requested tribal consultation prior to ground disturbing activities. The Choctaw Nation of Oklahoma responded on February 24, 2018 and noted that LaFourche Parish lay outside their area of historic interest. They also respectfully deferred to other contacted tribes. All agreed that cultural resource studies are warranted prior to approval of any development proposals.

The following tribes were contacted to notify them of the Proposed Action and to request comments or concerns:

- Louisiana State Historic Preservation Program
- Louisiana Natural Heritage Commission
- Alabama-Coushatta Tribe of Texas
- Alabama Quassarte
- Choctaw Nation

- Coushatta Indian Tribe
- Jena Band of Choctaw
- Kialagee Tribal Town
- Mississippi Band of Choctaw
- Thlopthlocco Tribal Town
- Tunica-Biloxi Tribe of Louisiana
- Muscogee (Creek) Nation

All agency and tribal correspondence is included in Appendix B of this EA.

1.7.3 Public Involvement

The BLM invites public participation in the NEPA process. Consideration of the views and information of all interested persons promotes open communication and enables more informed decision making. All agencies, organizations, and members of the public having a potential interest in the Proposed Action, including minority, low-income, disadvantaged, and Native American groups, are encouraged to participate in the decision making process.

The EA was made available for a 30-day review period. The lease sale notice is posted to the BLM Eastern States webpage at least 90 days prior to the sale and the National NEPA Register project webpage – typically 90 days prior to the sale but at a minimum of 45 days prior to the sale, which is required by regulation. Posting of the lease sale notice initiates a 30-day protest period for the proposed lease sale parcels.

2.0 CHAPTER 2 – DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

The CEQ's *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* establish a number of policies for federal agencies, including "using the NEPA process to identify and assess reasonable alternatives to the Proposed Action that would avoid or minimize adverse effects of these actions on the quality of the human environment" (40 CFR 1500.2 (e)). This chapter provides a detailed description of the Proposed Action and alternatives carried forward for analysis in the EA.

2.1 Proposed Action

The Proposed Action is to lease 5.56 acres of federal minerals located in LaFourche Parish, Louisiana for potential future oil and gas development. The proposed lease would provide the lessee exclusive rights to explore and develop oil and gas reserves on the lease, but does not in itself authorize surface disturbing activities. Before a lease owner or operator conducts any surface disturbing activities related to the development of this lease to access the federal minerals, the BLM must first approve an application for permit to drill (APD) as specified in Title 43 CFR 3162. In an APD, an applicant proposes to drill the well subject to the terms and conditions of the lease. Upon receipt of an APD, the BLM conducts an onsite inspection with the applicant and preferably, the private landowner or surface management agency. The BLM also conducts additional site-specific NEPA analysis and the appropriate consultations under the ESA and NHPA prior to approving the APD. Although there would be no surface disturbance from the action of leasing,

this EA analyzes a reasonably foreseeable development (RFD) scenario to address the potential environmental effects from potential future oil and gas development that are considered reasonably foreseeable, but unknown in specific detail at this point in time. For example, estimates can be made on the most likely number of wells that could be constructed, but the locations may change at the APD stage.

Oil and gas leases are issued for a 10-year period and continue for as long thereafter as oil or gas is produced in paying quantities. If a lessee fails to produce oil and gas, or does not make annual rental payments, or does not comply with the terms and conditions of the lease, or relinquishes the lease, then ownership of the minerals reverts back to the federal government.

2.1.1 RFD Scenario for Potential Oil and Gas Development for EOI #2277.

EOI #2277 totaling 5.56 acres consists of federally owned mineral estate underlying privately owned surface (split-estate). Reasonably foreseeable activities that could occur as a result of future oil and gas development associated with leasing this parcel include surface disturbance associated with preparation for drilling including construction of a road, drilling pad, and reserve pit (Table 2.1). Federal minerals will be incorporated post-leasing into a larger state-determined drilling and production unit. The total surface disturbance predicted under the RFD scenario is approximately 6.97 acres, which includes projected surface disturbance associated with well pads and pits (approximately 6.63 acres) and construction of access roads (approximately 0.34 acres) (Appendix C). The RFD scenario projects that one vertical well would be drilled from 1 well pad. Vertical wells would not penetrate federal minerals. The proposed pad would be located on Private Surface/Private Minerals (Fee/Fee). There will be no surface disturbance on the parcel.

Table 2.1 RFD Scenario Disturbances (acres) for Louisiana EOI #2277.

File #	State and County	EOI Acres	Access Roads	Well Pad and Pit	Utility and/or Pipeline ROW	Initial Disturbance	Partial Reclamation	Net Disturbance
EOI 2277	LA, LaFourche Parish	5.56	0.34	6.63	0 –Use access rd ROW	6.97	0.34	6.63

Constructed access roads normally have a running surface width of approximately 30 feet; the length is dependent upon the well site location in relation to existing roads or highways. The average length of road construction is approximately 0.5 miles. Typically, 5-7 acres are cleared and graded level for the construction of the drilling pad for a well projected to be greater than 14,000' in depth. If the well produces natural gas, and the flowline is in the road, another 0.5 acres may be affected by flowline construction. These disturbances are typical for private or federal ownership well pad locations. However, specific disturbance acreage for this EOI is listed above in Table 2-1. The excavation reserve pit is typically about five feet deep and is lined with bentonite clay to retain drilling fluids, circulated mud, and cuttings. Plastic or butyl liners (or its equivalent), that meet state standards for thickness and quality, are used on occasions when soils are determined incapable of holding pit fluids.

Drilling typically continues around the clock. Once drilling is completed, excess fluids are pumped out of the pit and disposed of in a state authorized disposal site and the cuttings are buried. The

RFD scenario assumes that wells would be drilled by rotary drilling using mud as the circulating medium. Mud pumps would be used to force mud down the drillpipe, thereby forcing the rock cuttings out the wellbore. Water would normally be obtained from a well drilled on the site, however, water could be pumped to the site from a local pond, stream or lake through a pipe laid on the surface. Approximately 1,500 barrels of drilling mud would be typically kept on the location. If a tract is adjacent to a producing field and water production is expected during the life of the field, separation, dehydration and other production processing may be necessary. Construction of facilities off the federal lease may be needed to handle this processing. Some processing or temporary storage may be necessary on site.

During well pad construction, the topsoil would likely be stockpiled for use during restoration activities. If the well is successful, the drill pad would be reduced to about 100 feet x 100 feet with the remaining surface area, including the reserve pit, re-graded and restored as per the surface owner/surface management agency requirements. A lease notice for the proposed lease encourages the use of non-invasive cover plants during all restoration and stabilization activities and is attached to the proposed lease. Final seed mixtures and plantings are determined with recommendations from BLM with approval of the land owner. The remaining 100 feet x 100 feet pad would be maintained for the life of the well. The life of a productive well may be 25 years. Following abandonment, the pad is subject to the same restoration parameters.

Appendix A contains the lease stipulations and lease notices for the parcel. These recommended lease stipulations and notices have been developed by BLM to provide general habitat protection and setbacks. Additional surveys or consultations may be required after site-specific proposals have been received by BLM during the development phase.

2.2 No Action Alternative

Under the No Action Alternative, the BLM would not offer for competitive bid or lease the proposed 5.56 acres of federal mineral estate for potential future oil and gas development. Not leasing EOI #2277 would not meet the purpose of and need for the Proposed Action. CEQ guidelines (40 CFR 1502) stipulate that the No Action Alternative should be analyzed to assess any environmental consequences that may occur if the Proposed Action is not implemented and to serve as a baseline for comparing impacts of the Proposed Action. Therefore, the No Action Alternative has been retained for analysis in this EA.

2.3 Alternatives Considered but Dismissed

EOI #2277 contains 5.56 acres; however, BLM did not consider any other alternatives aside from the Proposed Action and the No Action Alternative. However, prior to signing the Decision Record for this EA, the BLM Authorized Officer will make a determination on whether this parcel would be offered for lease, based on the analysis presented in this EA.

3.0 CHAPTER 3 – DESCRIPTION OF THE AFFECTED ENVIRONMENT

This chapter describes the environment that would potentially be affected by implementation of the Proposed Action, as required by CEQ regulations for implementing NEPA (40 CFR Parts

1500-1508). The discussion in this chapter focuses on the relevant resources and issues and only those elements of the affected environment that have the potential to be affected are described in detail.

Based on a review of the context and scale of the Proposed Action, the following resources are discussed in detail in this EA: Land Use, Visual/Noise/Recreation Resources, Socioeconomics and Environmental Justice, Cultural Resources and Native American Concerns, Minerals and Mineral Development, Wastes, Soils, Air Resources, Water Resources – Surface/Ground Water, Wetlands/Riparian Areas/Floodplains and Natural Resources including; Invasive/Exotic Species, Vegetation and Wildlife, Special Status Species, Migratory Birds of Concern, Public Health and Safety, and Transportation.

The following resources have been eliminated from further discussion from the EA, because either the resource is not present or there are no anticipated effects to the resource. A brief summary explaining why the resource was eliminated is also provided below.

- Lands with Wilderness Characteristics, Areas of Critical Environmental Concern, Wilderness Study Areas, Wild and Scenic Rivers. None of these resources are present on or in the immediate vicinity of the proposed lease parcel.

3.1 Land Use

EOI #2277

EOI #2277 is located in LaFourche Parish, Louisiana in the Southern Holocene Meander Belts ecoregion (Level IV) of the larger Mississippi Alluvial Plains ecoregion (Level III) in the Gulf Coastal Plain province, which encompasses all of Louisiana. According to the USGS, this ecoregion consists of a mostly flat, broad floodplain only interrupted by river terraces, levees, and roadways. Soils are poorly drained except in sandy river terraces and alluvial fans (Daigle, J.J., et al., USGS 2006). Bottomland deciduous forest was the dominant native vegetation prior to large-scale agricultural clearing. Presently, most of this area, including EOI #2277, is in cropland and subjected to intensive modern agriculture practices – including heavy treatments of insecticides and herbicides. Primary crops include cotton, sugarcane, rice, soybeans, hay, and crawfish aquaculture.

EOI #2277 parcel is located < 1 mile southeast of Acadia, Louisiana, approximately midway between State Highway 1 and State Highway 20. The nearest large town and county seat is located ~3 miles north of EOI #2277, Thibodaux, Louisiana. According to U.S. Census Bureau data, Thibodaux had an estimated population of 14, 610 in 2016. The Mississippi River lies approximately 15 miles due north and New Orleans approximately 40 miles to the east. EOI #2277 is entirely composed of a triangular-shaped agricultural field. The nearest water body is Bayou Cutoff canal adjacent to the eastern edge of EOI #2277 that eventually connects southward to the Intracoastal Waterway.

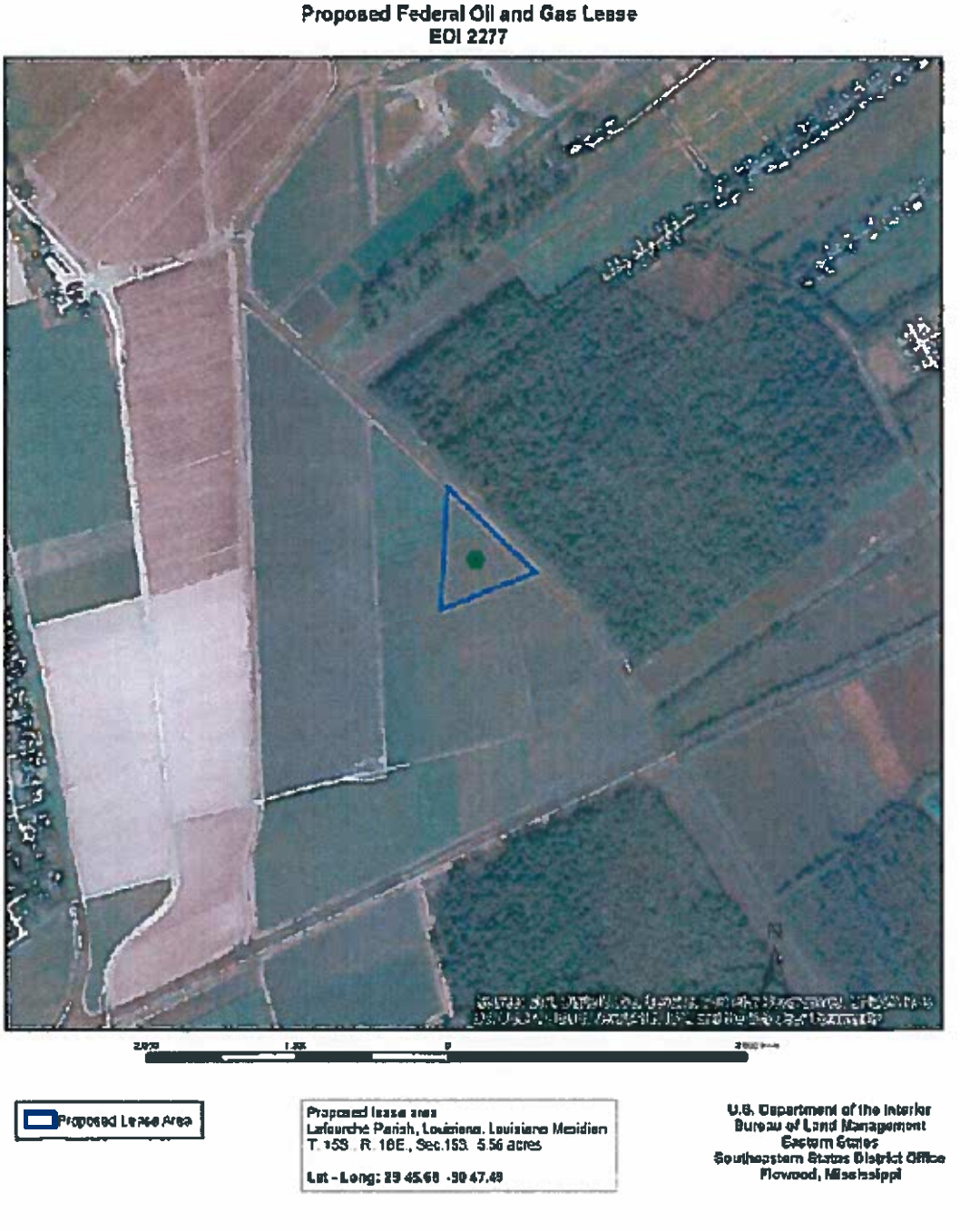

Figure 3-1. Aerial view of EOI #2277.

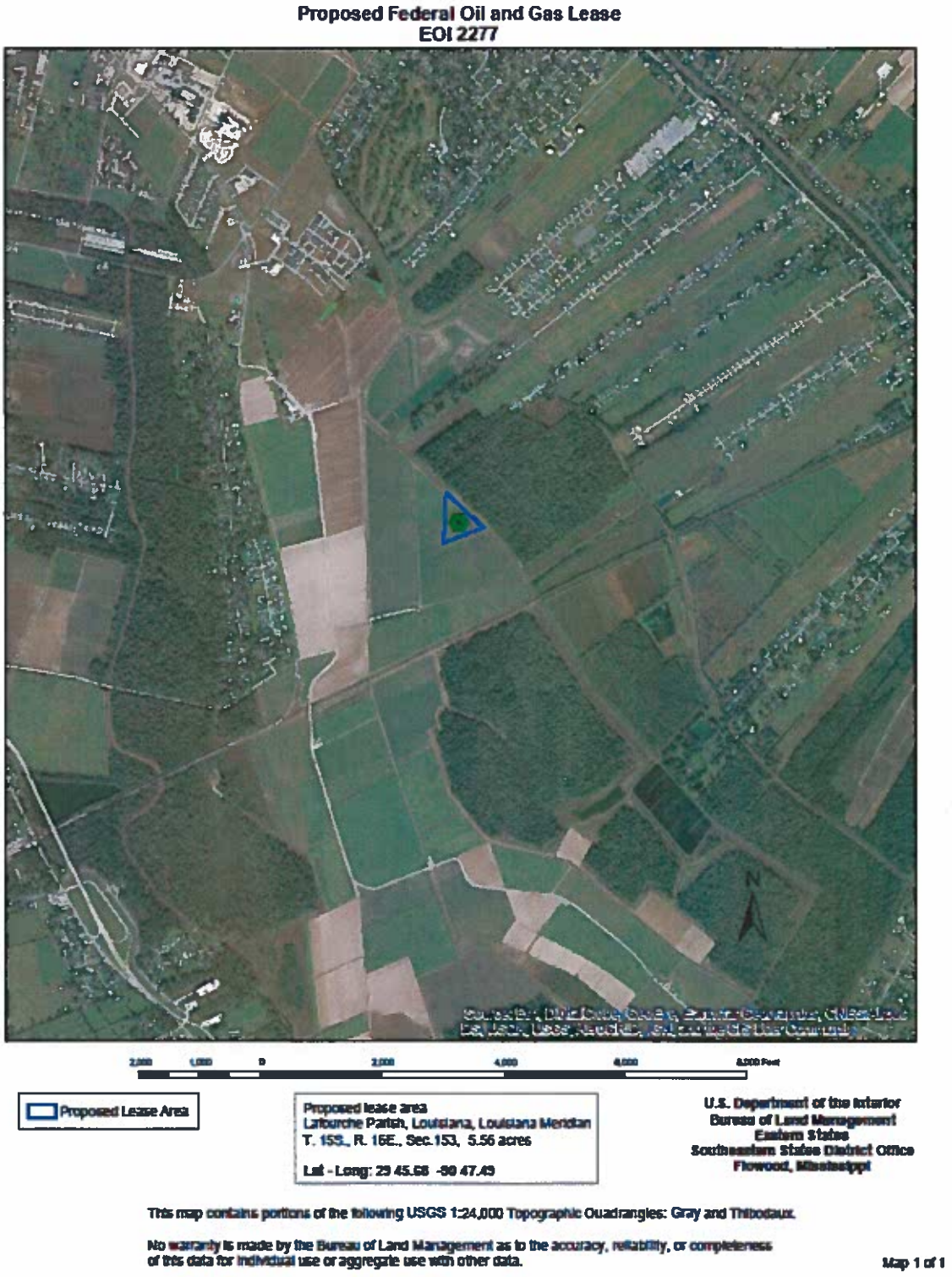

Figure 3-2. Aerial broad view of EOI #2277.

3.2 Visual/Noise/Recreation Resources

3.2.1 Visual Environment

The visual environment of the parcel and adjacent area is rural and minimally developed with flat topography. The proposed lease parcel is composed entirely of intensively managed agricultural field bordered by an adjacent canal waterway to the east. The surrounding area is composed of a mixture of agriculture and aquaculture fields on the outskirts of Thibodaux, Louisiana, with minimal development except for single household dwellings, agriculture production, and oil and gas development.

3.2.2 Noise Environment

The noise environment of the parcel and adjacent area is consistent with a rural, agricultural, non-industrial environment. Elevation and topographic position of the parcel may affect sound to a greater degree than straight line distance alone would indicate. The extent to which individuals are affected by noise is controlled by several factors, including the duration and frequency of sound; the distance between the source and the receptor; the intervening natural or man-made barriers or structures; and the ambient environment. Typically, levels of noise are measured in units called decibels (dB). Because the human ear cannot perceive all pitches or frequencies equally well, noise measurements are adjusted or weighted to compensate for the human lack of sensitivity to low-pitched and high-pitched sounds. The A-weighting scale closely resembles the frequency response of the human ear and, therefore, the adjusted unit of measurement, the A-weighted decibel, or dBA, is used to characterize noise, and to quantify the impact of noise, produced by transportation (e.g., vehicle traffic) and construction activities.

Construction equipment generates between 70 and 115 decibels (dB). Typical noise associated with oil and gas activities include the actual drilling, the pumps (that extract the oil), the engines, the compressor and the vehicle traffic to and from the site. Noise associated with oil and gas development typically continues non-stop for 30 days for each well that is constructed, but after this initial development period, the noise is expected to subside.

No noise ordinance exists for rural areas of LaFourche Parish, Louisiana.

3.2.3 Recreation Resources

Access to recreational resources at the proposed parcel is limited because it is on private property. The immediate surrounding area on the proposed parcel also primarily consist of private lands. Few recreational resources are likely common on and surrounding the project area.

3.3 Socioeconomics and Environmental Justice

3.3.1 Socioeconomics

LaFourche Parish

LaFourche Parish, Louisiana consists of 1,068.21 square miles (U.S. Census Bureau: State and County Quick Facts, 2010). The 2016 county population was an estimated 98,305, which is a 1.8% increase from the 2010 census. The population per square mile in 2010 was 90.2 people. The median household income in 2012 – 2016 was $52,071.00. LaFourche Parish had 1,772 employer establishments in 2015 with 28,237 people employed (U.S. Census Bureau: State and County Quick Facts, 2016).

Table 3-1. Socioeconomic data (2012-2016) for LaFourche Parish, Louisiana.

Parish	Sq. Miles	2010 Population	2016 Population, Change from 2010	Median Annual Income ($)	Poverty Level (%)
LaFourche	1,068.21	96,596	98,305	52,071	17.1
Louisiana (State)	43,203.90	4,533,479	4,681,666	45,652	20.2

(U.S. Census Bureau: State and County Quick Facts, 2010-2016).

3.3.2 Environmental Justice

EO 12898 (1994) formally requires Federal agencies to incorporate environmental justice as part of their missions. Specifically, it directs agencies to address, as appropriate, any disproportionately high and adverse human health or environmental effects of their actions, programs, or policies on minority or low-income populations.

Minority populations as defined by the CEQ under the 1997 Environmental Justice guidance under NEPA include individuals in the following population groups: African American, American Indian or Alaskan Native, Asian or Pacific Islander, and Hispanic. A minority population is identified where "(a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater..." (CEQ 1997). Additionally, "[a] minority population also exists if there is more than one minority group present and the minority percentage, as calculated by aggregating all minority persons, meets one of the above-stated thresholds" (CEQ 1997). Low-income populations are determined by the U.S. Census Bureau based on poverty thresholds developed every year.

U.S. Census data is used to determine whether the populations residing in the analysis area constitute an "environmental justice population" through meeting either of the following criteria:

- At least one-half of the population is of minority or low-income status; or
- The percentage of population that is of minority or low-income status is at least 10 percentage points higher than for the entire state of Louisiana.

Table 3-2. 2016 Population by Race (%) for LaFourche Parish, Louisiana.

Parish	White	Black	Asian	American Indian	Native Hawaiian
LaFourche	80.5	13.6	1.0	3.0	0.1
Louisiana (State)	63.2	32.6	1.8	0.8	0.1

Z Value greater than zero but less than half unit of measure shown.
(U.S. Census Bureau: State and County Quick Facts, 2010-2016).

As shown in Table 3-1, the poverty level in LaFourche Parish (17.1%) is approximately 3.1% lower than the state of Louisiana (20.2%). Also, as shown in Table 3-2, the percentages of the population in LaFourche Parish that are Black (13.6%), Asian (1.0%), American Indian (3.0%), and Native Hawaiian (0.1%) do not occur at a 10 percent or higher level than for the state of Louisiana (Black 32.6%, Asian 1.8%, American Indian 0.8%, and Native Hawaiian 0.1%). Therefore, there do not appear to be potential environmental justice populations present in this parish.

3.4 Cultural Resources and Native American Concerns

3.4.1 Cultural Resources

A cultural resource is a broad term that refers to areas of traditional significance, use and the remains of past and current human activity. These resources may be the physical remains of a prehistoric or historic archeological site or a place of traditional cultural significance or use. A Traditional Cultural Property (TCP) refers to the connection between places on the landscape and a group's traditional beliefs, religion, or cultural practice. Because cultural resources are nonrenewable and easily damaged, laws and regulations exist to help protect them.

The NHPA, as amended, and its implementing regulations require that federal agencies consider the effects of their undertakings on "historic properties." The term "historic properties" refers to cultural properties, both prehistoric and historic, that are eligible for listing in the National Register of Historic Places (NRHP). Traditional sacred places and traditional use areas of tribes are also considered cultural historic properties that may be eligible for the NRHP, because of their association with cultural practices and beliefs rooted in history and their importance in maintaining the cultural identity of ongoing American Indian communities. Consultations about these uses and places are governed and/or mandated by the NHPA, as amended in 1992 (USC 470 et seq.), the American Indian Religious Freedom Act of 1978 (42 USC 1996), the Native American Graves Protection and Repatriation Act of 1990 (25 USC 3001 et seq.) and EOs 13007, 13175, 13084, and 13647. Federal agencies consider the effects of their management activities on historic properties by first determining the area of potential effect, then conducting literature searches and field surveys to locate cultural properties. Additionally, they consult with Native American Indian Tribes and other interested parties to determine whether TCPs are within the area of potential effect.

Cultural resource surveys have not been conducted on EOI #2277 and therefore there may be undiscovered cultural resources present on or around the parcel. Literature reviews indicate this

lease parcel does not have recorded historic or cultural resources and may have surveys and sites within one mile. The proposed lease area may have undiscovered sites that would qualify as historic properties (36 CFR 61). A professionally conducted survey for historic properties would add information on human utilization of this area.

3.4.2 Native American Concerns

Federally recognized Native American tribes and groups have been contacted about this proposed undertaking (see Section 1.8.2). Known sites of Native American religious activities have not been located. The area has not been surveyed for cultural resources. Religious sites or sites of cultural importance to Native Americans may be present.

3.5 Minerals and Mineral Development

The objective horizons for EOI #2277 are multiple, stacked sands of middle Miocene age. The commodity is natural gas and crude oil with other associated liquid hydrocarbons. The projected well is classified as a Deeper Pool Exploratory test of the Rousseau/Thibodeau Field structural complex.

The well for EOI #2277 would be drilled vertically. Wells drilled in these sand formations do not require hydraulically fracturing or "fracking" in order to establish commercial production.

3.6 Wastes

The Resource Conservation and Recovery Act (RCRA) of 1976 established a comprehensive program for managing hazardous wastes from the time they are produced until their disposal. The United States Environmental Protection Agency (USEPA) regulations define solid wastes as any "discarded materials" subject to a number of exclusions. On January 6, 1988, USEPA determined that oil and gas exploration, development and production wastes would not be regulated as hazardous wastes under the RCRA. The Comprehensive Environmental Response Compensation and Liability Act (CERCLA) of 1980, deals with the release (spillage, leaking dumping, accumulation, etc.), or threat of release of hazardous substances into the environment. Despite many oil and gas constituent wastes being exempt from hazardous waste regulations, certain RCRA exempt contaminants could be subject to regulations as a hazardous substance under CERCLA.

No hazardous or solid waste disposal sites are located on the proposed lease parcel. Should the parcel be leased and the federal minerals developed, generation and temporary storage of waste materials (solid and liquid) would likely occur near the lease parcel.

3.7 Soils

There are two primary soil series (clays) found on EOI #2277; a Schriever clay, 0-1% slopes, and a Cancienne loamy clay, also 0-1% slopes (Soil Survey Staff, NRCS, 2018). The Schriever series comprises approximately 70% of the parcel and the Cancienne approximately 30% of the parcel. These soils are both deep, poorly to somewhat poorly drained, very slowly to moderately slowly

permeable soils that were formed in loamey to clayey alluvium. Schriever soils occupy a lower topographic position (sloughs, depressions, backswamps) that is more frequently saturated and flooded when unprotected by levees. Cancienne is a mineral soil and is located on intermediate to high positions on levees and river terraces. It normally maintains a saturation of 1.5 to 4 feet below surface level during the late winter-early spring rainy season. Slopes range from 0 to 3 percent for both series. On EOI #2277, the Cancienne series is located out in the field, away from Bayou Cutoff. Agriculture is the primary use for both soils. Sugarcane, rice, soybeans, corn, and wheat are the principal crops. Pasture and hay are uses in some areas. Bottomland hardwoods dominate frequently flooded areas of Schriever. Large areas of Cancienne have been cleared for urban, industrial, and residential use (Soil Survey Staff, NRCS, 2018).

3.8 Air Resources

3.8.1 Air Quality

In the general area of the parcel, the primary sources of air pollution are dust from blowing wind on disturbed or exposed soil, exhaust emissions from motorized equipment, oil and gas development, agriculture, and industrial sources. The USEPA was given the authority for air quality protection with the provision to delegate this authority to the state as appropriate under United States law. The Louisiana Department for Environmental Quality (LDEQ) has been delegated the authority for air quality protection in Louisiana. The Clean Air Act of 1970, as amended, requires the establishment of National Ambient Air Quality Standards (NAAQS). NAAQS pollutants include carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM_{10} and $PM_{2.5}$), sulfur dioxide (SO_2), and lead (Pb). The NAAQS pollutants are monitored in Louisiana by the LDEQ. The Clean Air Act identifies two types of NAAQS. Primary standards define levels of air quality that the USEPA judges to be necessary, with an adequate margin of safety, to protect the public health. Secondary standards define levels of air quality that the USEPA judges to be necessary to protect the public from any known or anticipated adverse effects of a pollutant. Both primary and secondary standards are currently in effect (Table 3-3).

Table 3-3. National Ambient Air Quality Standards.

	Primary Standards		**Secondary Standards**	
Pollutant	**Level**	**Averaging Time**	**Level**	**Averaging Time**
Carbon Monoxide	9 ppm (10 mg/m^3)	8-hour [1]	None	
	35 ppm (40 mg/m^3)	1-hour [1]		
Lead	0.15 µg/m^3 [2]	Rolling 3-Month Average	Same as Primary	
	1.5 µg/m^3	Quarterly Average	Same as Primary	
Nitrogen Dioxide	53 ppb [3]	Annual (Arithmetic Average)	Same as Primary	
	100 ppb	1-hour [4]	None	
Particulate Matter (PM_{10})	150 µg/m^3	24-hour [5]	Same as Primary	
Particulate Matter ($PM_{2.5}$)	15.0 µg/m^3	Annual [6] (Arithmetic Average)	Same as Primary	

	Primary Standards		Secondary Standards	
Pollutant	**Level**	**Averaging Time**	**Level**	**Averaging Time**
	35 µg/m^3	24-hour (7)	Same as Primary	
Ozone	0.075 ppm (2008 std)	8-hour (8)	Same as Primary	
	0.08 ppm (1997 std)	8-hour (9)	Same as Primary	
	0.12 ppm	1-hour (10)	Same as Primary	
Sulfur Dioxide	0.03 ppm	Annual (Arithmetic Average)	0.5 ppm	3-hour (1)
	0.14 ppm	24-hour (1)		

Note:

(1) Not to be exceeded more than once per year.

(2) Final rule signed October 15, 2008.

(3) The official level of the annual NO_2 standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of clearer comparison to the 1-hour standard.

(4) To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100 ppm (effective January 22, 2010).

(5) Not to be exceeded more than once per year on average over 3 years.

(6) To attain this standard, the 3-year average of the weighted annual mean PM2.5 concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m3.

(7) To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m3 (effective December 17, 2006).

(8) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm. (effective May 27, 2008).

(9) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.
(b) The 1997 standard—and the implementation rules for that standard—will remain in place for implementation purposes as USEPA undertakes
rulemaking to address the transition from the 1997 ozone standard to the 2008 ozone standard.
(c) USEPA is in the process of reconsidering these standards (set in March 2008).

(10) USEPA revoked the 1-hour ozone standard in all areas, although some areas have continuing obligations under that standard ("anti-backsliding").
(b) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is ≤ 1.

Air quality in a given region can be measured by its Air Quality Index (AQI) value. The AQI is reported according to a 500-point scale for each of the major criteria air pollutants, with the worst denominator determining the ranking. The AQI is a national index and the air quality rating is an important indicator for populations sensitive to air quality changes. The closest air monitoring station to the parcel is located in Thibodaux, Louisiana. On January 24, 2018, the AQI in Thibodaux had a "Good" rating of 15 at 3.609 UG/M3 for particulate matter ($PM_{2.5}$) and 16 for ozone at 17 PPB (Louisiana DEQ 2017).

3.8.1.1 Visibility

Visibility, also referred to as visual range, is a subjective measure of the distance that light or an object can clearly be seen by an observer. Light extinction is used as a measure of visibility and is calculated from the monitored components of fine particle mass (aerosols) and relative humidity. It is estimated that the average natural background visibility range for the eastern U. S. varies from 65 to 121 miles. Visibility range information is not available for Louisiana.

There are three classifications of areas that attain NAAQS: Class I, Class II, and Class III. Congress established certain national parks and wilderness areas as mandatory Class I areas where only a small amount of air quality degradation is allowed. Since 1980, the Interagency Monitoring of Protected Visual Environments network has measured visibility in Class I areas. These are managed as high visual quality under the federal visual resource management program. The Clean Air Act 1997 amendment declared "as a national goal the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I federal areas...from manmade air pollution" 42 USC Section 7491(a)(1).25. All other areas of the United States are designated as Class II, which allow a moderate amount of air quality degradation. No areas of the United States have been designated Class III, which would allow more air quality degradation. The Clean Air Act gives federal managers the affirmative responsibility, but no regulatory authority, to protect air quality-related values, including visibility, from degradation.

There is one (1) Class I area in Louisiana: Breton Wilderness Area (40 CFR Part 81.412, P.L. 93-632). Breton National Wildlife Refuge (NWR) is the only Class I area in Louisiana. It was originally established in 1904 as a refuge and breeding ground sanctuary for migratory birds and other wildlife (USFWS 2013). Breton NWR is composed of the Chandeleur Islands and North and South Breton Islands in the Gulf of Mexico; accessible only by boat (USFWS 2013). This ~5,000 acre (above high tide level) NWR is located in Plaquemines and St. Bernard Parishes, Louisiana. Congress designated Breton NWR as a wilderness in 1975 and a Class I air quality area in 1977 (USFWS 2013). The southern tip of Breton NWR is located ~ 112 miles east of EOI #2277 in LaFourche Parish. There are no Class I areas near the proposed lease parcel.

Prevention of Significant Deterioration (PSD) increments limit air quality degradation and ensure that areas with clean air continue to meet NAAQS, even during economic development. The PSD program goal is to maintain pristine air quality required to protect public health and welfare from air pollution effects and "to preserve, protect and enhance the air quality in national parks, national wilderness areas, national monuments, national seashores, and other areas of special national or regional natural, recreation, scenic or historic value." PSD increments have been established for NO_2, SO_2, and PM_{10}. Comparisons of potential PM_{10}, NO_2, and SO_2 concentrations with PSD increments are intended only to evaluate a threshold of concern. The allowable PSD increment depends on an area's classification. Class I areas have lower increments, due to their protected status as pristine areas. PSD increment data is currently unavailable for Louisiana.

3.8.2 Climate and Climate Change

3.8.2.1 Local Climate

Louisiana has a humid climate influenced by and as a result of its location; sub-tropical latitude with the Gulf of Mexico to the south, the North American continental landmass to the north, and lying at the mouth of the Mississippi River valley (LDEQ 2004). The climate is characterized by long, warm summers and short, mild winters. Prevalent winds from the south/southeast bring warm, moist air from the Gulf, resulting in abundant rainfall (LDEQ 2004). The statewide annual average precipitation varies from 48 inches in the northwestern part of the state near Shreveport to 64 inches in the southeastern coastal plains near Thibodaux (LDEQ 2004). Summer

temperatures range from 85 degrees Fahrenheit (°F) to 95 °F during the afternoon and 65 °F to 75 °F in the early morning. Winters are generally mild, and only rarely are there days when the temperature fails to rise above freezing. Average winter temperatures range from 55°F to 65 °F in the afternoon and from 40°F to 50 °F in the early morning hours.

Louisiana lies in the path of hurricanes moving northward from the Gulf of Mexico during the late summer and fall. Hurricane season is from June through November (NetState 2016). Rainfall amounts vary with the storms, ranging from a trace to a record 22 inches for a 3-day period in 1922. Moderate to severe flooding is sometimes associated with these storms (USDA 1999). Hurricane Katrina hit the Gulf Coast in 2005 and was the costliest natural disaster as well as one of the five deadliest hurricanes in the history of the U.S. At least 1,245 people died in the hurricane and subsequent floods in multiple states. Tornadoes can develop any time of the year, but the primary season is from March to May. Their occurrence is most common in April. A second tornado season takes place from November to January. Intense, localized rainfall is often associated with these storms (USDA 1999).

3.8.2.2 Global Climate

Scientific research shows that global climate is influenced by many factors including natural processes (i.e., changes in the sun's intensity or changes in ocean circulation) and human activities (such as burning fossil fuels and increased urbanization) (Intergovernmental Panel on Climate Change [IPCC] 2013). History shows that in the past, the earth has gone through a number of ice ages with periods of warming and droughts between periods. The most recent Ice Age ended around 13,000 years ago and the climate has warmed and dried since then. The warming and drying has not been continuous. However, the rate at which atmospheric CO_2 concentrations has risen in the past years appears to correspond with observed temperature changes.

Global mean surface temperatures have increased nearly 1.0°C (1.8°F) from 1890 to 2006 (Goddard Institute for Space Studies 2007). In 2001, the IPCC indicated that by the year 2100, global average surface temperatures would increase 1.4 to 5.8°C (2.5 to 10.4°F) above 1990 levels. The National Academy of Sciences (2008) has confirmed these findings, but also indicated that there are uncertainties regarding how changes in climate may affect different regions.

Ongoing scientific research is studying the potential effects of certain types of pollutants on global climate, particularly those that are "greenhouse gases (GHG)" (composed of carbon dioxide, CO_2; methane, CH_4; nitrous oxide, N_2O; water vapor; and several trace gasses). Through complex interactions on a regional and global scale, scientific research shows that these pollutants cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the earth back into space.

Some GHGs such as CO_2 occur naturally and emit into the atmosphere through natural processes and human activities. Human activities create and emit other GHGs (e.g., fluorinated gases). The primary GHGs that enter the atmosphere as a result of anthropogenic activities include CO_2, CH_4, N_2O, and fluorinated gases such as hydrofluorocarbons (HFC), perfluorocarbons (PFC), and sulfur hexafluoride (SF). Fluorinated gases are powerful GHGs that emit from a variety of industrial

processes including production of refrigeration/cooling systems, foams and aerosols; however, fluorinated gases are not primary to the activities authorized by the BLM.

Although research shows a relationship between GHG and temperature, the variety of scientific tools designed to predict changes in local or global climate limits the ability to definitively identify potential future impacts on climate. Currently, the LDEQ does not have mandatory GHG reporting requirements beyond the federal mandatory GHG reporting rule (40 CFR 98).

3.9 Water Resources - Surface/Ground Water

The Louisiana Department of Natural Resources, Office of Conservation (LDNROC) regulates oil and gas operations in the state of Louisiana. The LDNROC has the responsibility to gather oil and gas production data, permit new wells, establish pool rules and oil and gas allowables, issue discharge permits, enforce rules and regulations of the division, monitor underground injection wells, and ensure that abandoned wells are properly plugged and the land is responsibly restored. The LDEQ administers major environmental protection laws. The LDEQ administers all Water Quality Act regulations pertaining to surface and groundwater (except sewage not present in a combined waste stream). According to the LDEQ, produced water if predictable in salt concentration, can be used for drilling and completion and possibly cementing.

3.9.1 Surface Water

Surface water hydrology within the area is typically influenced by geology, soil characteristics, precipitation and vegetation. EOI #2277 does not contain surface water (in the form of rivers, creeks, branches etc.) on the proposed lease parcel.

Bayou Cutoff is the nearest body of surface water to EOI #2277; lying adjacent to the east parcel boundary. It eventually empties into the Intracoastal Waterway to the south. Approximately 1.5 miles east is Bayou Lafourche, the primary source of fresh surface water in LaFourche Parish (Table 3-4) supplying the majority of water used for public supply (Prakken and Lovelace, 2013). Bayou Lafourche carries diverted water from the Mississippi River by a dam at Donaldsonville, Louisiana. Nearby surface water includes Bayou Folse, Hollywood Canal, numerous smaller canals and aquaculture (mainly crawfish) impoundments.

Table 3-4. Water withdrawals, in million gallons per day by source in Lafourche Parish, Louisiana, 2010 (modified from Sargent, 2011).

Aquifer or surface-water body	Groundwater	Surface Water
Mississippi River alluvial aquifer	4.09	
Bayou Lafourche		29.96
Gulf Intracoastal Waterway		3.82
Other water bodies		4.10
Total	4.09	37.88

(Prakken and Lovelace, 2013).

Water resources may be affected by many activities including fire/prescribed burns, irrigation, military use, mineral extraction, recreation, transportation, and vegetation management activities. The most likely effects to hydrology will be to stream channel morphology, and water quality.

Channel alterations can be measured in specific morphological parameters. Water nutrients can be measured in concentration per unit volume.

3.9.2 Groundwater Resources

Two (2) aquifers, the Mississippi River alluvial and the Gramercy, are the primary sources of groundwater in LaFourche Parish (Prakken and Lovelace, 2013). Both aquifers lie between 400 - 450 feet (ft) at their respective aquifer bases below the National Geodetic Vertical Datum of 1929 (NGVD 29). The Mississippi River alluvial aquifer contains saltwater (water with chloride concentrations greater than 250 mg/L) and is underlain by the Gramercy aquifer, the only known fresh groundwater in LaFourche Parish (Prakken and Lovelace, 2013). Both aquifers contain fine to medium sands in the upper aquifer strata that grade to coarser sands and possible gravel in the lower parts (Tomaszewski, 2003). In 2010, 4.09 Mgal/d of groundwater were withdrawn in LaFourche Parish, primarily for industry and aquaculture (Table 3-5).

Table 3-5. Water withdrawal, in million gallons per day (Mgal/d), by category in LaFourche Parish Louisiana, 2010 (modified from Sargent, 2011).

Use category	Groundwater	Surface Water	Total
Public supply	0.00	22.69	22.69
Industrial	1.06	3.46	4.51
Rural domestic	0.02	0.00	0.02
Livestock	0.11	0.11	0.23
General Irrigation	0.00	0.05	0.05
Aquaculture	2.89	11.57	14.46
Total	**4.09**	**37.88**	**41.97**

(Prakken and Lovelace, 2013).

According to the Louisiana Department of Natural Resources (LDNR) state well registration records in 2009 (over 100 active water wells) for LaFourche Parish, all reported groundwater withdrawals in the parish came from the Mississippi River alluvial aquifer or Gramercy aquifer (Prakken and Lovelace, 2013).

Groundwater hydrology within the areas is influenced by geology and recharge rates. The Mississippi River alluvial aquifer is recharged seasonally by the Mississippi River as well as rainfall infiltration while the Gramercy aquifer is recharged by rainfall in outcrop areas north of LaFourche Parish and by leakage from the overlying Mississippi River alluvial aquifer (Prakken and Lovelace, 2013). Groundwater quality and quantity can be influenced by precipitation, water supply wells, and various disposal activities (Kresse, et al. USGS, 2014). Most onshore produced water is injected deep underground for either enhanced recovery or disposal. With the passage of the Safe Drinking Water Act in 1974, the subsurface injection of fluids came under federal regulation. In 1980, the USEPA promulgated the Underground Injection Control regulations. The program is designed to protect underground sources of drinking water.

Areas of poor water quality can result from both natural and anthropogenic sources. Natural sources of contamination are typically regional in extent and are related to water-rock interactions. Anthropogenic impacts include both point and nonpoint sources of contamination. Nonpoint sources can result in large areas of impact, although contaminant concentrations typically are significantly lower than point sources, and the contaminants typically represent soluble, non-

reactive species. Point sources of contamination often result in elevated levels of contaminants that exceed federal maximum contaminant levels; however, the extent of contamination normally is confined to a small area, with little to no offsite migration or impact on receptors (LDEQ 2008).

3.10 Wetlands/Riparian Areas/Floodplains

Wetland habitats provide important wintering and migration habitat for several species of migratory birds. Wetlands also provide a link between land and water and are some of the most productive ecosystems in the world. EO 11990 on the Protection of Wetlands provides an opportunity for early review of federal agency plans regarding new construction in wetland areas. Under EO 11990, each agency shall provide leadership and shall take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities for conducting federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating and licensing activities.

The Mississippi River lies ~ 40 miles east with no topographical interruption except for river terraces, levees, and elevated roadways. The natural Mississippi River alluvial floodplain river system has been extensively modified for flood control and navigation purposes within the Southern Holocene Meander Belts (Level IV) ecoregion containing EOI #2277. Conversion to agricultural cropland has caused widespread loss of native bottomland hardwood forest and associated wetlands. The nearest wetland/riparian areas are Bayou Cutoff and a small patch of bottomland hardwood forest that both lie eastward and adjacent to EOI #2277.

3.11 Invasive/Exotic Species

Noxious weeds can have a disastrous impact on biodiversity and natural ecosystems. Noxious weeds affect native plant species by out-competing native vegetation for light, water and soil nutrients. Noxious weeds cause $2 to $3 million in estimated losses to producers annually. These losses are attributed to: 1) decreased quality of agricultural products due to high levels of competition from noxious weeds, 2) decreased quantity of agricultural products due to noxious weed infestations, and 3) costs to control and/or prevent the spread of noxious weeds.

There are a number of non-native species that are considered invasive in Louisiana. Louisiana State University (LSU) Agriculture Center (2007) has published a list of invasive species documented in Louisiana, summarized in the table below. The potential applicability of these invasive species' habitat to the proposed tract is discussed below. None of the invasive species on this list were confirmed present on the parcel. The table below notes if the tract contains suitable habitat for the species.

Table 3-6. List of invasive species documented to occur in Louisiana by the Louisiana State University (LSU) Ag Center.

COMMON NAME	SCIENTIFIC NAME	HABITAT SUITABILITY ON PARCEL
Alligator weed	*Alternanthera philoxeroides*	No suitable habitat on parcel
Japanese climbing fern	*Lygodium japonicum*	Potential habitat on parcel
Chinaberry	*Melia azedarach*	Potential habitat on parcel

Johnson grass	*Sorghum halepense*	Potential habitat on parcel
Chinese privet	*Ligustrum sinense*	Potential habitat on parcel
Japanese honeysuckle	*Lonicera japonica*	Potential habitat on parcel
Brazilian vervain	*Verbena brasiliensis*	Potential habitat on parcel
Cogon grass	*Imperata cylindrica*	Potential habitat on parcel
Chinese tallow tree	*Triadica sebifera*	Potential habitat on parcel
Common salvinia	*Salvinia minima*	No suitable habitat on parcel
Hydrilla	*Hydrilla verticillata*	No suitable habitat on parcel
Mimosa	*Albizia julibrissin*	Potential habitat on parcel
Water hyacinth	*Eichhorinia crassipes*	No suitable habitat on parcel

Source: USDA 2007.

3.12 Vegetation and Wildlife

3.12.1 Vegetation

EOI #2277

EOI #2277 (Figures 1-1, 3-1, and 3-2) consists of 5.56 acres of privately owned surface located in LaFourche Parish, Louisiana in the Southern Holocene Meander Belts ecoregion (Level IV) of the larger Mississippi Alluvial Plains ecoregion (Level III) in the Gulf Coastal Plain province, which encompasses all of Louisiana. According to the USGS, this ecoregion consists of a mostly flat, broad floodplain with depressions containing ponded wetlands, swamps, and lakes only interrupted by river terraces and levees. Soils are generally poorly drained excepting sandy river terraces and alluvial fans (Daigle, J.J., et al., USGS 2006). Bottomland hardwood forest was the dominant native vegetation prior to large-scale agricultural clearing. Presently, most of this area, including EOI #2277, is under cultivation and subjected to intensive modern agriculture practices – including heavy treatments of insecticides and herbicides. Primary crops include cotton, sugarcane, rice, soybeans, hay, and crawfish aquaculture.

EOI #2277 is a triangular-shaped, open, agriculture field that has remained in sugarcane production for over a decade. It is bordered on the east by Bayou Cutoff. It is otherwise surrounded by agriculture fields under similar sugarcane production. The sugarcane is produced on a four-year rotation where new plants are planted every fourth year. Undesirable plants and weeds are controlled by mechanical and herbicide treatments.

3.12.2 Wildlife

Wildlife species diversity and abundance on EOI #2277 is likely extremely low due to the lack of wildlife habitat diversity and abundance present in commercial agricultural fields with a bordering canal on one side. Species likely present include overflights of birds of prey, mourning dove (*Zenaida macroura*), passerines, waterfowl and wading birds, insects, reptiles, and field dwelling rodents during the growing season such as the field mouse (*Mus musculus*) and cotton rat (*Sigmodon hispidus*).

Agriculture is a major use of this ecoregion along with aquaculture, hay and pasture use, and limited recreation. Fishing and hunting are popular pastimes in Louisiana and fish and game species populations are regionally high enough to support these activities.

3.13 Special Status Species

3.13.1 State Listed Species

Tables 3-7 to 3-8 list rare invertebrate, vertebrate, and plant species documented to occur in LaFourche Parish by the Louisiana Natural Heritage Program (LNHP) that have been given a State Rank of S1 (critically imperiled), S2 (imperiled) or S3 (rare) including the availability of suitable habitat on the parcel.

LNHP found no records for the occurrence of rare plants and animals, outstanding natural communities, natural or scenic rivers, or other elements of special concern within the proposed parcel site.

Table 3-7. List of rare animal species documented to occur in LaFourche Parish by the LNHP and the availability of suitable habitat on the proposed tract.

Common Name	Scientific Name	State Rank	Global Rank	Suitable Habitat on Parcel
Red Wolf	*Canis rufa*	SX	G1Q	No
Snowy Plover	*Charadrius alexandrinus*	S1B, S2N	G4	No
Piping Plover	*Charadrius melodus*	S2N	G3	No
Wilson's Plover	*Charadrius wilsonia*	S2B, S1N	G5	No
Reddish Egret	*Egretta rufescens*	S1	G4	No
Peregrine Falcon	*Falco peregrinus*	S3N	G4	No
Bald Eagle	*Haliaeetus leucocephalus*	S3	G5	No
Caspian Tern	*Hydroprogne caspia*	S1S2B, S3N	G5	No
Diamondback Terrapin	*Macroclemys terrapin*	S3	G4	No
Eastern Glass Lizard	*Ophisaurus ventralis*	S3	G5	No
Osprey	*Pandion haliaetus*	S3	G4	No
Brown Pelican	*Pelecanus occidentalis*	S3	G4	No
Roseate Spoonbill	*Platalea ajaja*	S3	G5	No

Table 3-8. List of rare plant species documented to occur in LaFourche Parish by the LNHP and availability of suitable habitat on the proposed tract.

Common Name	Scientific Name	State Rank	Global Rank	Suitable Habitat on Parcel
Gregg's Amaranth	*Amaranthus greggii*	S3	G4	No
Swamp Milkweed	*Asclepias incarnate*	S2	G5	No
Golden Canna	*Canna flaccida*	S4	G4	No
Cypress-knee Sedge	*Carex decomposita*	S2	G3	No
Big Sandbur	*Cenchrus myosuroides*	S1	G4	No
Dune Sandbur	*Cenchrus tribuloides*	S2	G5	No
Floating Antler Fern	*Ceratopteris pteridoides*	S2	G5	No

Canada Spikesedge	*Eleocharis geniculate*	S1	G5	No
Rooted Spikerush	*Eleocharis radicans*	S1	G5	No
Millet Beakrush	*Rhynchospora miliacea*	S2	G5	No
Sand Rose-Gentian	*Sabatia arenicola*	S1	G3G5	No
Scaevola	*Scaevola plumieri*	SH	G5	No
Arrow-grass	*Triglochin striata*	S1	G5	No
Sea Oats	*Uniola paniculata*	S2	G5	No

3.13.2 Federally Listed Species

Section 7 of the ESA requires that federal agencies prevent or modify any projects authorized, funded, or carried out by the agencies that are "likely to jeopardize the continued existence of any endangered species or threatened species, or result in the destruction or adverse modification of critical habitat of such species." Table 3-9 lists threatened and endangered species documented by USFWS to occur in LaFourche Parish, Louisiana. The table also notes the presence of suitable habitat on the parcel. Specific information regarding habitat requirements is provided below under each species section. Details regarding species habitat, habits, threats and other information has been obtained from the Nature Serve website (www.natureserve.org) and published literature.

3.13.2.1 Special Status Species (LaFourche Parish)

Table 3-9. List of threatened and endangered species documented to occur in LaFourche Parish by USFWS

Species	Federal Status	Determination	Rationale
West Indian Manatee (*Trichechus manatus*)	Threatened	No effect	No suitable habitat present
Piping Plover (*Charadrius melodus*)	Threatened; Critical Habitat	No effect	No suitable habitat present
Red Knot (*Calidris canutus rufa*)	Threatened	No effect	No suitable habitat present
Atlantic Sturgeon (*Acipenser oxyrinchus*)	Threatened	No effect	No suitable habitat present
Green Sea Turtle (*Chelonia mydas*)	Threatened	No effect	No suitable habitat present
Hawksbill Sea Turtle (*Eretmochelys imbricata*)	Endangered	No effect	No suitable habitat present
Kemps Ridley Sea Turtle (*Lepidochelys kempii*)	Endangered	No effect	No suitable habitat present
Leatherback Sea Turtle (*Dermochelys coriacea*)	Endangered	No effect	No suitable habitat present
Loggerhead Sea Turtle (*Caretta caretta*)	Threatened	No effect	No suitable habitat present

3.13.2.1.1 West Indian Manatee (*Trichechus manatus*) (Threatened)

The West Indian manatee (*Trichechus manatus*) is federally listed as endangered and can be found in shallow coastal waters, estuaries, bays, rivers and lakes. They are unable to tolerate prolonged exposure to water colder than 20 degrees Celcius. They prefer waters at least 1-2

meters in depth. Along the coast, manatees are often found in water 3-5 meters deep in areas lacking strong current. Threats include habitat loss and degradation, mortality from boat collisions, hunting, fishing, red tide poisoning, entrapment in water control structures, entanglement in fishing gear, and exposure to cold temperatures.

Suitable habitat for the West Indian manatee does not exist on EOI #2277 located in LaFourche Parish.

3.13.2.1.2 Piping Plover (*Charadrius melodus*) (Threatened: Critical Habitat)

The piping plover is a small, stocky, shorebird with a sand-colored upper body, white underside, and orange legs. They grow up to 7 inches long and weigh just 2.25 ounces. Their food consists of worms, fly larvae, beetles, crustaceans, mollusks, and other invertebrates. The piping plover is a migratory bird which often returns to the same nesting area in consecutive years. This species lives near ocean beaches or on sand or algal flats in protected bays. It is most abundant on expansive sandflats, sandy mudflats, and sandy beach in close proximity; usually in areas with high habitat heterogeneity.

Piping plovers are migratory shorebirds and there are records of them resting and feeding at stopover sites in Mississippi on their way between their breeding grounds in the northern Great Plains and Great Lakes region and their wintering grounds along the Coast of the Gulf of Mexico. Suitable stopover habitat includes riverine sandbars, gravel pits along rivers, mudflats from pond or lake drawdowns, and flat, wide, sparsely vegetated sand or gravel beaches.

There are water bodies near EOI #2277 located in LaFourche Parish; however, there is no suitable stopover habitat to support the piping plover.

3.13.2.1.3 Red Knot (*Calidris canutus rufa*) (Threatened)

The red knot is a migratory medium-sized shorebird that breeds and nests in the Arctic and winters in southern South America. Overharvest and a declining abundance of a key food item, horseshoe crab eggs, are considered key threats to the red knot. Declining horseshoe crab populations, particularly in key migratory stopover areas such as Delaware Bay, contribute to a reduced red knot presence. Oil pollution, human disturbance, and loss of habitat to development are considered additional threats. Although the majority of individuals pass through specific, localized sites, records exist of red knots resting and feeding at stopover sites on the Gulf coast. Suitable stopover habitat includes relatively undisturbed sandy beaches and tidal flats.

While water bodies are present around EOI #2277 located in LaFourche Parish, there is no suitable stopover habitat to support the red knot.

3.13.2.1.4 Atlantic Sturgeon (*Acipenser oxyrinchus*) (Threatened)

Atlantic sturgeon is a large (up to 13 feet), anadromous fish, one that spends the majority of its 60+ year lifespan near inshore, brackish, saltwater and migrates to freshwater rivers in spring for spawning and returns to saltwater in fall. Some may remain near spawning areas. The first two

(and up to six years) are spent in freshwater, riverine habitats. It feeds on benthic invertebrates and small fishes. It spawns in fresh water (sometimes tidal), usually in natal river, over hard bottoms of clay, rubble, gravel, or shell. Reasons for population declines include overfishing (mainly commercial overharvest), habitat loss due to dam construction and water pollution. Records exist of Atlantic sturgeon along the Gulf Coast as far as the mouth of the Mississipp River, and Lake Ponchartrain, LA.

There is no suitable habitat present on EOI #2277 for the Atlantic Sturgeon.

3.13.2.1.5 Green Sea Turtle (*Chelonia mydas*) (Threatened)

The green sea turtle (*Chelonia mydas*) is federally listed as threatened. Major threats, which vary throughout the range, include degradation of nesting habitat, including beach lighting, human predation on nesting females and turtles in foraging areas, collection of eggs for human consumption, predation on eggs, and collisions with power boats. Nesting for the sea turtle occurs on beaches, usually on islands but also on the mainland. At least in some regions, individuals generally nest at the same beach in successive nestings. Feeding occurs in shallow, low-energy waters with abundant submerged vegetation and also in convergence zones in the open ocean. Green sea turtles are occasionally observed in offshore waters of Mississippi and have been reported from inshore areas, west of the Mississippi River.

Suitable habitat for the green sea turtle does not exist on EOI #2277 located in LaFourche Parish.

3.13.2.1.6 Hawksbill Sea Turtle (*Eretmochelys imbricata*) (Endangered)

The Hawksbill is an endangered yet widely distributed sea turtle in tropical and subtropical seas. They are widespread, highly mobile, and migratory with populations occurring in the Atlantic, Indian, and Pacific Oceans. Nesting beaches and marine feeding areas are often thousands of miles apart causing extensive migratory travel for adults. Nesting locations are negatively impacted by loss of beach habitat due to human encroachment, development, and disturbance thus leading to a decline in overall hawksbill populations. Other threats include commercial harvest for the tortoiseshell market, subsistence harvest, and loss of suitable nesting habitat. Hawksbills are primarily invertivores; consuming mostly invertebrates (crabs, sea urchin, shellfish, jellyfish) but also including plant material and fishes. Recent research has identified partial diet specialization on demosponges in Florida and the Caribbean.

Suitable habitat for the hawksbill sea turtle does not exist on EOI #2277 located in LaFourche Parish.

3.13.2.1.7 Kemps Ridley Sea Turtle (*Lepidochelys kempii*) (Endangered)

The Kemp's Ridley (*Lepidochelys kempii*) is an endangered sea turtle that occurs mainly in the coastal areas of the Gulf of Mexico (adults) and northwestern Atlantic (immature). Juveniles and sub-adults occupy shallow, coastal regions and are commonly associated with crab-laden, sandy or muddy water bottoms. Small turtles are generally found near shore from May through October. Adults may be abundant near the mouth of the Mississippi River in spring and summer.

Adults and juveniles move offshore to deeper, warmer water during the winter. Between the East Gulf Coast of Texas and the Mississippi River Delta, Kemp's Ridleys use near shore waters, ocean sides of jetties, small boat passageways through jetties, and dredged and non-dredged channels. They have been observed within both Sabine and Calcasieu Lakes. Major threats to this species include over-exploitation on their nesting beaches, drowning in fishing nets, and pollution. Kemp's Ridley sea turtles appear to prefer habitats in the inshore areas of the Gulf of Mexico. Kemp's Ridley are characteristically found in waters of low salinity, high turbidity, high organic content, and where shrimp are abundant. Kemp's Ridley in the Gulf of Mexico tend to be concentrated around the major river mouths, such as the Rio Grande, Calcasieu, and Mississippi. Prior to the dramatic decline in their population, they were quite common in Louisiana/Mississippi coastal waters.

Suitable habitat for the Kemp's Ridley sea turtle does not exist on EOI #2277 located in LaFourche Parish.

3.13.2.1.8 Leatherback Sea Turtle (*Dermochelys coriacea*) (Endangered)

Leatherback sea turtles (*Dermochelys coriacea*) are federally listed as endangered. They are widely distributed with major concentrations located year-round in the Pacific Ocean north of Hawaii and seasonally in the Atlantic Oceans in summer and fall. Nesting occurs in tropical and sub-tropical regions while foraging occurs in more temperate waters. The first few years of life are spent almost entirely in tropical waters. Major threats include egg collecting and mortality associated with bycatch in fishery operations, harvest of adult females for meat and oil, nesting habitat loss, pollution, and adult ingestion of floating plastics and trash. They can be found in the open ocean often near the edge of the continental shelf. They can also be found in gulfs, bays, and estuaries. They nest on sloping sandy beaches backed up by vegetation, often near deep water and rough seas. Leatherbacks are uncommon in the inshore waters of Mississippi, but are occasionally reported from offshore waters near the mouth of the Mississippi River.

Suitable habitat for the leatherback sea turtle does not exist on EOI #2277 located in LaFourche Parish.

3.13.2.1.9 Loggerhead Sea Turtle (*Caretta caretta*) (Threatened)

Threatened loggerhead sea turtles (*Caretta caretta*) nest within the continental U.S. from Louisiana to Virginia, with major nesting concentrations occurring on the coastal islands of North Carolina, South Carolina, and Georgia, and on the Atlantic and Gulf coasts of Florida. In Louisiana, loggerheads are known to nest on the Chandeleur Islands. Nesting and hatching dates for the loggerhead in the northern Gulf of Mexico are from May 1 through November 30. The primary threats to this species are destruction of nesting habitat and drowning in fishing nets. They are one of the most commonly reported sea turtles in Mississippi and occasionally enter estuarine bays.

Suitable habitat for the loggerhead sea turtle does not exist on EOI #2277 located in LaFourche Parish

3.14 Migratory Bird Species of Concern

The Migratory Bird Treaty Act of 1918 (MBTA), as amended, makes it unlawful to"pursue, hunt, take, capture, kill, attempt to take, capture or kill, or possess any migratory bird or any part, nest, or egg of any such bird", unless expressly permitted by Federal regulations (16 U.S.C. 703(a)). Executive Order (EO) 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, directs Federal agencies to integrate conservation principles, measures, and practices into authorized activities and avoid or minimize, to the extent practicable, adverse impacts on migratory bird resources. The Service and the BLM signed a memorandum of understanding (MOU) in 2010, to promote the conservation and strategic management of migratory birds on BLM managed public lands and Federal mineral split estate lands. Measures to comply with the MBTA shall be applied to ensure protection for migratory birds and encourage conservation actions in oil and gas development activities that might otherwise adversely impact habitats.

No surface disturbance is authorized at the leasing stage and any oil and gas development activities will require additional surveys and consultation. Onshore Oil and Gas Order 7 requires that produced water pits "shall be fenced or enclosed to prevent access by livestock, wildlife, and unauthorized personnel". Additionally, the Order requires deterrents to exclude birds from open fluid pits. At the APD stage, design features, applicant committed BMPs, conservation actions, and Conditions of Approval (COAs) may be applied to provide migratory bird protections.

The BLM identified the migratory bird species in Table 3-10, including native passerines (flycatchers and songbirds), birds of prey, migratory waterbirds (waterfowl, wading birds, and shorebirds), and other species such as doves, hummingbirds, swifts, and woodpeckers. Among the wide variety of species protected by the MBTA, special concern is usually given to the following groups:

- Species that migrate across long distances, particularly Neotropical migrant passerines that winter in tropical or Southern Hemisphere temperate zones
- Birds of prey, which require large areas of suitable habitat for finding sufficient prey
- Species that have narrow habitat tolerances and hence are vulnerable to extirpation from an area as a result of a relatively minor habitat loss
- Species that nest colonially and hence are vulnerable to extirpation from an area as a result of minor habitat loss

Because of the many species that fall within one or more of these groups, BLM focuses on species identified by USFWS as Birds of Conservation Concern (BCC) (USDI USFWS 2008). Table 3-10 lists the BCC found in the Mississippi Alluvial Valley Region where EOI #2277 is located. There is little suitable habitat on the proposed lease parcel and surrounding area for most BCC on these lists.

Table 3-10. List of BCC found in the Mississippi Alluvial Region (EOI #2277).

Common Name	Scientific Name	Suitable Habitat Located on Parcel
American Bittern (nb)	*Botaurus lentiginosus*	Potential
Least Bittern	*Ixobrychus exilis*	Potential
Swallow-tailed Kite	*Elanoides forficatus*	Potential
Bald Eagle (b)	*Haliaeetus leucocephalus*	No
Peregrine Falcon (b)	*Falco peregrinus*	No
Yellow Rail (nb)	*Coturnicops noveboracensis*	Potential
Black Rail	*Laterallus jamaicensis*	Potential
Solitary Sandpiper (nb)	*Tringa solitaria*	No
Hudsonian Godwit (nb)	*Limosa haemastica*	No
Marbled Godwit (nb)	*Limosa fedoa*	No
Buff-breasted Sandpiper (nb)	*Tryngites subruficollis*	No
Short-billed Dowitcher (nb)	*Limnodromus griseus*	No
Short-eared Owl (nb)	*Asio flammeus*	Yes
Red-headed Woodpecker	*Melanerpes erythrocephalus*	No
Sedge Wren	*Cistothorus platensis*	Potential
Wood Thrush	*Hylocichla mustelina*	No
Cerulean Warbler	*Dendroica cerulea*	No
Prothonotary Warbler	*Protonotaria citrea*	No
Swainson's Warbler	*Limnothlypis swainsonii*	Potential
Kentucky Warbler	*Oporornis formosus*	No
Henslow's Sparrow (nb)	*Ammodramus henslowii*	Potential
LeConte's Sparrow (nb)	*Ammodramus leconteii*	Potential
Painted Bunting	*Passerina ciris*	No
Dickcissel	*Spiza americana*	Potential
Rusty Blackbird (nb)	*Euphagus carolinus*	No
Orchard Oriole	*Icterus spurius*	No

Note: (a) - ESA candidate, (b) - ESA delisted, (c) - non-listed subspecies or population of threatened or endangered species, (nb) - non-breeding in this Bird Conservation Region. Source: U.S. Fish and Wildlife Service. 2008. Birds of Conservation Concern 2008. United States Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, Virginia. 85 pp. [Online version available at http://www.fws.gov/migratorybirds/]

3.15 Public Health and Safety

NEPA requires federal agencies to evaluate whether a Proposed Action is significant based on the "degree to which the proposed action affects public health or safety" (40 CFR 1508.27). Public health and safety is often considered within the context of other resources, such as air quality, water quality and/or quantity, environmental justice, or transportation, among others, and is typically assessed in terms of what the expected risk is to the human environment as a result of the Proposed Action. For this EA, public health and safety issues are generally considered within the boundary of the proposed lease parcel; although some issues related to public health and safety, such as air quality, requires consideration of a larger affected environment due to the potential dispersion of air emissions.

A fundamental agency value of BLM is to operate in a safe manner and to provide a safe environment for the public. This safety outlook applies to all types of projects proposed by BLM

and on BLM-administered lands, including mineral development. The BLM has the responsibility along with state and local authorities to implement the appropriate measures, when needed to provide for public safety.

Onshore Oil and Gas Orders are a way in which BLM implements and supplements the oil and gas regulations found at 43 CFR 3160 for conducting oil and gas operations, particularly at the APD stage. These Onshore Orders are listed below:

- **Order No. 1** - Approval of Operations: This Order provides procedures for submitting an Application for Permit to Drill and all required approvals of subsequent well operations and other lease operations;
- **Order No. 2** – Drilling: This Order provides requirements and standards for drilling and abandonment;
- **Order No. 6** - Hydrogen Sulfide Operations: This Order provides the requirements and standards for conducting oil and gas operations in an environment known to or expected to contain hydrogen sulfide (H2S) gas; and
- **Order No. 7** - Disposal of Produced Waters: This Order provides the methods and approvals necessary to dispose of produced water associated with oil and gas operations.

3.16 Transportation

Existing roadways on EOI #2277 is an unimproved dirt turnrow for farming on the east boundary; however, no existing turn-row or roadway would be impacted or constructed since no well pad would be placed directly on the lease parcel but within the larger, state-determined drilling and production unit area – i.e. no surface disturbance. For EOI #2277, any increase in vehicle traffic resulting from future mineral development would not potentially cause ground and wildlife disturbance or an increase in noise, dust, and soil compaction.

4.0 CHAPTER 4 - ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

This chapter assesses the anticipated environmental consequences associated with direct, indirect, and cumulative effects of the Proposed Action and No Action Alternative. In accordance with DOI and BLM NEPA procedures, the level of detail, scope, and complexity of analyses should be commensurate with the scale, impacts, scientific complexities, uncertainties, and other aspects (such as public concern), inherent in potential decisions. Therefore, the level of analysis presented in this EA for each resource is based on factors such as the size of the project and anticipated level of effect. The Proposed Action of leasing the parcel would, by itself, have no direct impact on any resources in the lease area since there would be no surface disturbing activities. All anticipated resource impacts would be associated with potential future oil and gas development. For the purpose of this EA, a RFD scenario is used to assess the potential impacts from reasonably foreseeable, but yet uncertain, future oil and gas development as a result of leasing the parcel. If development results from the proposed leases, short-term impacts from potential development are considered those that would be stabilized or mitigated within five years and long-term impacts are those that would substantially remain for more than five years. Cumulative impacts include the combined effect of past projects, specific planned projects and other reasonably foreseeable future actions such as other infield wells being located within the nearby area. Cumulative impacts are addressed at the end of this Chapter.

4.1 Land Use

4.1.1 Proposed Action

There would be no direct impacts to land use as a result of leasing as there would be no surface disturbing activities at this stage. The RFD scenario developed for this EA predicts that approximately 6.97 acres of surface disturbance would occur; not on the proposed parcel, but nearby within the larger, state-determined drilling and production unit area in the future. There would likely be short and long-term changes to land use as a result of reasonably foreseeable oil and gas development on this land. Reclamation activities at the site would result in some of the land being reverted to natural conditions over time.

4.1.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcel would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease area.

4.2 Visual/Noise/Recreation Resources

4.2.1 Proposed Action

Under the Proposed Action, the RFD scenario projects approximately 6.97 acres of surface disturbance as a result of reasonably foreseeable oil and gas development. Visual impacts may be short or long term, depending on when oil and gas activities commence and are completed. While the act of leasing federal minerals would produce no impacts to visual resources since there is no surface disturbing activities at this time, subsequent exploration/development could affect visual quality on adjacent lands through: increased visibility of constructed features such as roads, well pads, pipelines, and tank batteries; road degeneration from heavy trucks and vehicles following rain; dust and exhaust from construction, drilling, and production vehicles and equipment; vegetation removal; unreclaimed sites; and discarded equipment. Well pads, power lines, access roads, and associated production facilities and storage tanks have the greatest potential to alter visual conditions for the life of the well. Vegetation removal would present an obvious contrast in color with the surrounding vegetation and affect foreground and middle ground distance zones for more than a decade. These impacts would be most obvious immediately after construction. Impacts would decrease as the disturbed surface begins to blend in color, form, and texture, when interim or final reclamation occurs. Long-term visual impacts could persist as long as the well is producing, which could be a couple of years to more than 50 years. Long-term impacts may include vegetation removal, alteration of the landscape, and installation of equipment and facilities. Reclamation activities would result in some of the land being reverted to natural conditions over time.

Noise generation from well operations would be associated with vehicle movements and the operation of production equipment. There could be short-term noise impacts associated with construction, drilling, and/or completion of reasonably foreseeable oil and gas development

activities but the intensity of the impacts would likely be minimal. Noise generating activities would lessen over time as production commences, when the site would be visited periodically and/or to haul produced fluids. There is no development on EOI #2277 and minimal development surrounding the parcel, so it is likely that few residences would be disturbed from noise associated with potential future oil and gas development within the state-determined drilling and production unit containing EOI#2277.

The proposed project site is located on and surrounded by private property. Little recreational activity is likely to occur on and surrounding the project area. Short-term impacts may occur during drilling but long-term impacts are not expected to either recreational activity.

4.2.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcel would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease area.

4.3 Socioeconomics and Environmental Justice

4.3.1 Proposed Action

4.3.1.1 Socioeconomics

The direct effect of the Proposed Action would be the payments received, if any, from the leasing of 5.56 acres of federal mineral estate. If the lease is sold and it leads to actual well drilling and economic production in the future, it would likely bring modest revenues in the form of royalty payments, severance taxes, and rent monies to the state and county. Economic production would provide wages and salaries to employees, maintenance staff, and contractors employed in drilling wells, and sales to area hotels, restaurants, and other businesses that serve drillers for the duration of drilling and similar construction-related benefits later as wells are abandoned and sites restored. Other effects could include the potential for increases in traffic congestion, noise and visual impacts associated with fluid mineral production.

It is speculative to predict the exact effects of this action since there is no guarantee that the lease will receive bids, and that the parcel will be developed and produce fluid minerals. Any APDs received would require additional site-specific NEPA analysis which would further examine socioeconomic impacts to the local economy. It is unknown how oil and gas surface disturbances associated with exploration and development, such as construction of roads, well pads, and other infrastructure would affect the oil and gas sector or the associated services economy in LaFourche Parish. At this time, it is not possible to determine the magnitude and duration of potential impacts either in terms of payments received or changes in employment patterns in LaFourche Parish, but any effects would be anticipated to be beneficial.

4.3.1.2 Environmental Justice

As seen in Section 3.3.2, Environmental Justice, there is low potential for the presence of environmental justice populations; therefore, no disproportionate effects are anticipated as a result of the Proposed Action. The proposed lease would not create an unsafe or unhealthy environment for any population, including minority and low-income populations and therefore would not be out of conformance with EO 12898. The direct effect of the Proposed Action would be the payments received, if any, from the leasing of the 5.56 acres of federal mineral estate. Indirect positive environmental justice effects could include potential future employment opportunities related to oil and gas and service support industries that might result, should the lease be sold and whether exploration and development of the lease occurs. It is speculative to predict the exact effects of the leasing action to human health and the environment, as site-specific development proposals and analysis would be examined in future NEPA. The total surface disturbance estimated for this lease sale parcel based on the RFD scenario of 1 well pad is approximately 6.97 acres. Potential adverse human health or environmental effects related to oil and gas production are not quantifiable at this stage but are limited in extent as to not likely to disproportionately affect low-income or minority populations. Specific impacts to public health, such as the potential for contamination of surface waters and aquifers are considered extremely unlikely based on the thousands of feet of clay and sands separating target formations from underground reservoirs. Additional discussion of the effects of oil and gas operations to water quality can be found in Section 4.9. Potential impacts to water use on low income or minority populations would be analyzed in more detail at the APD stage.

4.3.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcel would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease area.

4.4 Cultural Resources and Native American Concerns

4.4.1 Proposed Action

There would be no direct impacts to cultural resources or Native American interests as a result of leasing as there would be no surface disturbance at this stage. Cultural resource surveys have not been conducted on EOI #2277 and therefore there may be undiscovered cultural resources present on or around the parcel. Literature reviews from the state historic preservation office indicate this lease parcel does not have recorded historic or cultural resources and may have surveys and sites within one mile. Direct and indirect impacts from reasonably foreseeable future oil and gas development may occur to cultural resources or to a potentially sacred Native American religious site if there is ground disturbance however, no cultural resources would be impacted or disturbed since no well pad would be placed directly on the lease parcel but within the state-determined drilling and production unit area – i.e. no surface disturbance. Direct impacts are those such as completely destroying a site by bulldozing the area and workers picking up artifacts. Indirect impacts are those such as erosion or compaction of the soil on the site. If sites are located and

recorded before ground disturbance begins, these impacts can be avoided or mitigated (see Section 4.4.3).

Consultation with the SHPO and coordination with the tribes occurred from January 23, 2018 to February 24, 2018 (Appendix B). A concurrence letter was received from SHPO on April 9, 2018 (Appendix B). Responses were received from three (3) tribes from January 25 to February 24, 2018 agreeing that cultural resource studies are warranted prior to approval of any development proposals.

4.4.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcel would not be made available for lease. If the proposed lease was not made available and cultural resource surveys are not conducted, direct and indirect impacts may occur. Direct impacts are those such as completely destroying a site by "relic hunters" or by people picking up artifacts. Other direct impacts may be the mixing of layers in a site by plowing or the destruction of a site by land leveling. Indirect impacts are those such as after timber thinning or clear-cutting resulting in erosion of a site.

4.4.3 Possible Future Best Management Practices, Standard Operating Procedures and/or Mitigation Measures

If federal minerals are proposed for development in the future, an APD would be required and the BLM would conduct additional site-specific analysis of cultural resources. In order to protect cultural resources, a cultural resources survey is needed before ground disturbance begins. A report of the survey would be approved by the BLM and the SHPO before the APD is approved. If a known recorded site is located within the lease areas, it would be avoided up to 200 meters in order to protect these resources. If avoidance is not possible, then the appropriate mitigation measures would be identified in coordination with the SHPO. Additional consultation with the SHPO and the appropriate federally recognized Native Americans would occur before APD approval is given.

A BLM stipulation regarding cultural resources and Native American religious concerns applies to the lease parcel (Appendix A). The stipulation states that the BLM would not approve any ground disturbing activities that may affect historic properties and/or resources until it completes its obligations under applicable requirements of the NHPA and other authorities. If currently unknown burials are discovered during development activities associated with this lease, these activities must cease immediately, applicable law on unknown burials will be followed and, if necessary, consultation with the appropriate Tribe/group of federally recognized Native Americans would take place.

4.5 Minerals and Mineral Development

4.5.1 Proposed Action

There would be no direct impacts to minerals from the Proposed Action, since there would be no surface disturbing activities at this stage; however, subsequent exploration and oil and gas

development could impact the production horizons and reservoir pressures. If production wells are established, the resources allotted to the wells would eventually be depleted. There could also be impacts to other mineral resources as a result of exploration/development through the loss of available surface or subsurface area needed to develop or access the other mineral resource overlapping the subject lease parcel. The extent of the impacts to mineral resources, if any, would be further determined once site-specific development information is available at the APD stage.

4.5.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcel would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease area.

4.6 Wastes

4.6.1 Proposed Action

There would be no direct impacts due to waste generation from the Proposed Action, since there would be no surface disturbing activities at this stage; however, subsequent exploration/oil and gas development could result in the introduction of hazardous and non-hazardous substances to the area. Oil and gas development activities typically generate the following wastes: (1) discharge of drilling fluids and cuttings into the reserve pits, (2) wastes generated from used lubrication oils, hydraulic fluids, and other fluids used during production of oil and gas, some of which may be characteristic or listed hazardous waste, and (3) service company wastes from exploration and production activities as well as containment of some general trash. Certain wastes unique to the exploration, development, and production of crude oil and natural gas have been exempted from Federal Regulations as hazardous waste under Subtitle C of the RCRA of 1976. The exempt waste must be intrinsic to exploration, development or production activities and cannot be generated as part of a transportation or manufacturing operation. The drilling fluids, drill cuttings, and produced waters are classified as a RCRA exempt waste, and potential drilling that could occur would not introduce hazardous substances into the environment if they are managed and disposed of properly under federal, state, and local waste management regulations and guidelines. Properly used, stored, and disposed of hazardous and non-hazardous substances greatly decreases the potential for any impact on any environmental resources. One way operators and the BLM ensure hazardous and non-hazardous substances are properly managed is through the preparation of a Spill Prevention, Control, and Countermeasure (SPCC) plan.

Surface spills of drilling mud and additives, flowback water, and other formation fluids can happen at a variety of points in the development and production phases. Spills that occur can span a range of different spill sizes and causes of failure at any point in the process. For example, small spills often happen as the result of poor pipe connections or leaks; large spills sometimes occur as the result of a major well blowout, but such blowouts rarely occur. Additionally, spills from some parts of the phases may be the result of human error (i.e. vehicle collisions, improper handling, improper equipment operation or installation, etc.), while others stem from equipment failure (i.e.

broken pipes, torn pit liners, leading tanks, etc.) or acts of nature (Fletcher 2012). The most common cause of spills comes from equipment failure and corrosion (Wenzel 2012).

The cause of the spill, the spill size, the hazard rating of the spilled material, response time to clean up the spill and the effectiveness of the cleanup, all play a critical role in determining the overall impact on the environment. The volume of a spill can significantly vary with spill types. Pipe spills are not expected to release more than 1,000 gallons into the environment, retaining pit spills and truck spills are not expected to release more than 10,000 gallons of fluid, and blowouts are expected to cause the largest spills, with the potential to release tens of thousands of gallons into the environment. Small spills occur with greater frequency than large spills. Secondary containment or recovery for small spills would likely minimize, if not eliminate, any potential release into the environment. However, for spills on the order of several thousands of gallons of fluid, it is expected that less than half the fluid may be captured by secondary containment or recovery. The vast majority of operations do not incur reportable spills (5 gallons or more), indicating that the fluid management process can be, and usually is, managed safely and effectively (Fletcher 2012). There are several BLM standard conditions of approval (COAs) that apply at the APD stage which would reduce waste hazards (see Section 4.6.3 below).

4.6.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcel would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease area.

4.6.3 Possible Future Best Management Practices, Standard Operating Procedures and/or Mitigation Measures

If federal minerals are proposed for development in the future, an APD would be required and the BLM would conduct additional site-specific analysis of potential impacts from wastes. The following measures to reduce adverse impacts from wastes are common to most projects: all trash would be placed in a portable trash cage and hauled to an approved landfill, with no burial or burning of trash permitted, chemical toilets would be provided for human waste, fresh water zones encountered during drilling operations would be isolated by using casing and cementing procedures, a berm or dike would enclose all production facilities if a well is productive, and all waste from all waste streams on site would be removed to an approved disposal site. Future development activities would be regulated under the RCRA, Subtitle C regulations. Additionally, waste management requirements are included in the 12-point surface use plan and the 9-point drilling plan required for all APDs. Leaseholders proposing development would be required to have approved SPCCPs, if the applicable requirements of 40 CFR 112 are met, and comply with all requirements for reporting of undesirable events. Lease bonds would not be released until all facilities have been removed, wells are plugged, and satisfactory reclamation has occurred.

There are five standard BLM COAAs that would apply at the APD stage regarding handling and disposing of wastes, should federal minerals be accessed. These COAs include: storing wastes properly to minimize the potential for spills, providing secondary containment for all stored

containers, draining the reserve pit before closure and trucked to a disposal site, use of preventative measures to avoid drainage of fluids, sediments, and other contaminants from the pad into water bodies, and keeping the project area clear of trash.

Further, if shallow groundwater is expected or encountered at the project specific site, open reserve pits would not be authorized and all waste products would be hauled from the site to state-approved disposal facilities.

4.7 Soils

4.7.1 Proposed Action

While the act of leasing federal minerals would not affect soils, subsequent exploration/development may produce short and long-term impacts by physically disturbing the topsoil and exposing the substratum soil on subsequent project areas. Direct impacts from reasonably foreseeable oil and gas construction of well pads, access roads, and reserve pits include: removal of vegetation, exposure of the soil, mixing of horizons, compaction, loss of topsoil productivity and susceptibility to wind and water erosion. Wind erosion would be expected to be a minor contributor to soil erosion with the possible exception of dust from vehicle traffic during all phases of development. Vehicle traffic would be limited to approved travel routes in which the surface has not been paved or dressed in a material to prevent soil movement. The extent of wind erosion related to vehicle traffic would depend on a number of factors including: length of well bore, whether hydraulic fracturing is used during completion, whether telemetry is used during production, and whether the well is gas, oil, condensate, or a combination thereof. These impacts could result in increased indirect impacts such as runoff, erosion and off-site sedimentation. Activities that could cause these types of indirect impacts include construction and operation on well sites, access roads, gas pipelines and facilities.

Additional soil impacts associated with future development can occur when heavy precipitation causes water erosion damage. When water saturated segment(s) on the access road become impassable, vehicles may still be driven over the road. Consequently, deep tire ruts may develop. Where impassable segments are created from deep rutting, unauthorized driving may occur outside the designated route of access roads.

Contamination of soil from future drilling, and production wastes mixed into soil or spilled on the soil surface could cause a long-term reduction in site productivity. Contaminants spilled on soil would have the potential to pollute and/or change the soil chemistry (see also Section 4.6, Wastes). These impacts can be reduced or avoided through proper design, construction, maintenance and implementation of Best Management Practices (BMPs) and COAs as described below in Section 4.7.3.

4.7.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcel would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production

activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease area.

4.7.3 Possible Future Best Management Practices, Standard Operating Procedures and/or Mitigation Measures

If federal minerals are proposed for development in the future, an APD would be required and the BLM would conduct additional site-specific analysis of potential impacts to soils. The operator would stockpile the topsoil from the surface of well pads which would be used for surface reclamation of the well pads. During the life of the development, all disturbed areas not needed for active support of production operations should undergo "interim" reclamation in order to minimize the environmental impacts of development on other resources and used. Upon abandonment of wells and/or when access roads are no longer in service, final reclamation would be implemented.

The impact to the soil would be remedied upon reclamation of well pads when the stockpiled soil that was specifically conserved to establish a seed bed is spread over well pads and vegetation re-establishes. A permanent vegetation cover would be established on all disturbed areas. Road construction requirements and regular maintenance would alleviate potential impacts to access roads from water erosion damage.

Fluid impermeable containment systems (i.e. liners, dikes, berms) would be placed in, under and/or around any tank, pit, drilling cellar, ditches associated with the drilling process, or other equipment that use or has the potential to leak/spill hazardous and non-hazardous fluids, to completely prevent solid contamination (e.g. liners) at the site or prevent the spill from going beyond the immediate site (e.g. dikes, berms).

A standard BLM COA would apply at the APD stage, should federal minerals be accessed, which would require the operator to take necessary measures to ensure that the final graded slopes are stabilized to prevent the movement of soil from the pad area for the life of the project. Stabilization techniques could include: natural, organic matting, silt fences, and or additional mulching.

4.8 Air Resources

4.8.1 Air Quality

4.8.1.1 Proposed Action

The administrative act of offering the proposed lease parcel would have no direct impacts on air quality. Any potential effects to air quality would occur if and when the lease were developed. Any proposed development project would be subject to additional analysis of possible air effects before approval and the analysis may include air quality modeling. A Memorandum of Understanding between the Departments of the Interior and Agriculture and USEPA directs that air quality modeling be conducted for actions that meet certain emissions or geographic criteria:

- Creation of a substantial increase in emissions
- Material contribution to potential adverse cumulative air quality impacts

- Class I or sensitive Class II Areas
- Non-attainment or maintenance area
- Area expected to exceed NAAQS or PSD increment

The project area includes no Class I, sensitive Class II, or non-attainment areas. Due to the small number of wells projected to follow a lease on the lease tract in relation to the current volume of hydrocarbon, development of the lease is not likely to exceed the emissions criteria, NAAQS or PSD increment.

The following source of emissions are anticipated during any oil and gas exploration or development: combustion engines (i.e. fossil fuel fired internal combustion engines used to supply electrical or hydraulic power to drive the pumps and rigs used to drill the well, drill out the hydraulic stage plugs and run the production tubing in the well; generators to power drill rigs, pumps, and other equipment; compressors used to increase the pressure of the oil or gas for transport and use; and tailpipe emissions from vehicles transporting equipment to the site), venting (i.e. fuel storage tanks vents and pressure control equipment), mobile emissions (i.e. vehicles bringing equipment, personnel, or supplies to the location) and fugitive sources (i.e. pneumatic valves, tank leaks, and dust). A number of pollutants associated with combustion of fossil fuels are anticipated to be released during drilling including: CO, NOx, SO_2, Pb, PM, CO_2, CH_4, and N_2O. Venting may release VOC/HAP, H_2S, and CH_4. Mobile source emissions are likely to include fugitive particulate matter from dust or inordinate idling.

The actual emissions of each pollutant is entirely dependent on the factors described in the previous paragraph. During the completion phase, the most significant emissions of criteria pollutants emitted by oil and gas operations in general are VOCs, particulate matter and NO_2. VOCs and NOx contribute to the formation of O_3. The USEPA's Natural Gas STAR Program is a voluntary program that identifies sources of fugitive CH_4 and seeks to minimize fugitive CH_4 through careful tuning of existing equipment and technology upgrades. Data provided by STAR show that some of the largest air emissions in the natural gas industry occur as natural gas wells that have been fractured and are being prepared for production. During well completion, flowback, fracturing fluids, water, and reservoir gas come to the surface at high velocity and volume. This mixture includes a high volume of VOCs and CH_4, along with air toxins such as benzene, ethylbenzene, and n-hexane. The typical flowback process lasts from 3 to 10 days. Pollution also is emitted from other processes and equipment during production and transportation of the oil and gas from the well to a processing facility.

To reasonably quantify emissions associated with well exploration and production activities, certain types of information are needed. Such information includes a combination of activity data such as:

- The number, type, and duration of equipment needed to construct/reclaim, drill and complete (e.g. belly scrapers, rig, completions, supply trucks, compressor, and production facilities)
- The technologies which may be employed by a given company for drilling any new wells to reduce emissions (e.g. urea towers on diesel powered drill rigs, green completions, and multi-stage flares)

- Area of disturbance for each type of activity (e.g. roads, pads, pipelines, electrical lines, and compressor station)
- Compression per well (sales and field booster), or average horsepower for each type of compressor
- The number and type of facilities utilized for production

Air pollution can affect public health in many ways. Numerous scientific studies have linked air pollution to a variety of health problems including: (1) aggravation of respiratory and cardiovascular disease, (2) decreased lung function, (3) increased frequency and severity of respiratory symptoms such as difficulty breathing and coughing, (4) increased susceptibility to respiratory infections, (5) effects on the nervous system, including the brain, such as IQ loss and impacts on learning, memory, and behavior, (6) cancer, and (7) premature death. Some sensitive individuals appear to be at greater risk for air pollution-related health effects, for example, those with pre-existing heart and lung diseases (e.g., heart failure/ischemic heart disease, asthma, emphysema, and chronic bronchitis), diabetics, older adults, and children.

Degradation of air quality may also contribute damage to ecosystem resources. For example, ozone can damage vegetation, adversely impacting the growth of plants and trees. These impacts can reduce the ability of plants to uptake CO_2 from the atmosphere and can then indirectly affect the larger ecosystems.

4.8.1.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcel would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease area.

4.8.1.3 Possible Future Best Management Practices, Standard Operating Procedures and/or Mitigation Measures

The BLM encourages industry to incorporate and implement BMPs, which are designed to reduce impacts to air quality by reducing emissions, surface disturbances, and dust from field production and operations. Typical measures include:

- Flared hydrocarbon gases at high temperatures in order to reduce emissions of incomplete combustion
- Watering dirt roads during periods of high use to reduce fugitive dust emissions
- Co-location wells and production facilities to reduce new surface disturbance
- Implementation of directional drilling and horizontal completion technologies whereby one well provides access to petroleum resources that would normally require the drilling of several vertical wellbores
- Requiring that vapor recovery systems be maintained and functional in areas where petroleum liquids are stored
- Performing interim reclamation to reclaim areas of the pad not required for production facilities and to reduce the amount of dust from the pads

Additionally, the BLM encourages oil and natural gas companies to adopt proven, cost-effective technologies and practices that improve operational efficiency and reduce natural gas emissions.

4.8.2 GHGs and Climate

4.8.2.1 Proposed Action

The administrative act of leasing the proposed federal minerals would not result in any direct GHG emissions; however, potential future development of the proposed leases may contribute to the installation and production of new wells, which may consequently lead to an increase in GHG emissions.

Many aspects of oil and gas production emit GHGs. The primary aspects include the following:

- Fossil fuel combustion for construction and operation of oil and gas facilities which include vehicles driving to and from production sites, engines that drive drill rigs, etc. These produce CO_2 in quantities that vary depending on the age, types, and conditions of the equipment as well as the targeted formation, locations of wells with respect to processing facilities and pipelines, and other site-specific factors.

- Fugitive CH_4 is CH_4 that escapes from wells (both gas and oil), oil storage, and various types of processing equipment. This is a major source of global CH_4 emissions. These emissions have been estimated for various aspects of the energy sector, and starting in 2011, producers are required under 40 CFR 98, to estimate and report their CH_4 emissions to the USEPA.

- It is expected that drilling will produce marketable quantities of oil and/or gas. Most of these products will be used for energy, and the combustion of the oil and/or gas would release CO_2 into the atmosphere. Fossil fuel combustion is the largest source of global CO_2.

The assessment of GHG emissions, their relationship to global climatic patterns, and the resulting impacts is an ongoing scientific process. The inconsistency in results of scientific models designed to predict changes in climate on regional or local scales, limits the ability to assess the significance of any discrete amount of GHG emissions on global climate. When further information is available, such information would be incorporated in the BLM's planning and NEPA documents as appropriate.

4.8.2.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcel would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease area.

4.9 Water Resources - Surface/Ground Water

While the act of leasing federal minerals would produce no impacts to water resources, subsequent exploration and development of the lease parcel has the potential to produce impacts. The physical effects of mineral extraction include erosion, compaction, sedimentation, and potential groundwater contamination. Sedimentation and pollution of streams or wetlands can occur down-gradient from such activity sites (USDA 1999). Surface disturbance from the construction of well pads, access roads, pipelines, and utility corridors can result in degradation of surface water and groundwater quality from non-point source pollution, increased soil losses, and increased erosion.

4.9.1 Surface Water Resources

4.9.1.1 Proposed Action

Potential impacts to surface water that may occur from construction of well pads, access roads, fracturing ponds, pipelines, utility lines and production include:

- Increased surface runoff and off-site sedimentation brought about by soil disturbance
- Increased salt loading and water quality impairment of surface waters
- Channel morphology changes due to road and pipeline crossings and possible contamination of surface waters by spills

The magnitude of these impacts to water resources would depend on the proximity of the disturbance to the drainage channel, slope aspect and gradient, degree and area of soil disturbance, amount of local precipitation, soil character, and duration and time before implementation mitigation or clean up measures can be put into place.

Minor long-term direct and indirect impacts to the watershed could occur from water discharge from roads, road ditches, and well pads, but would decrease once all well pads and road surfacing material has been removed and reclamation of well pads, access roads, pipelines, and powerlines have taken place. Interim reclamation of the portion of the well pad not needed for production operation, re-vegetating the portion of the pad that is needed for production operations, and re-vegetating road ditches would reduce this long-term impact. Short-term direct and indirect impacts to the watershed from future access roads that are not surfaced with impervious materials would occur and would likely decrease in time due to reclamation efforts. All anticipated surface disturbance during future oil and gas production development would occur within the larger, state-determined drilling and production unit area but not on the lease parcel itself.

4.9.1.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcel would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease area.

4.9.1.3 Possible Future Best Management Practices, Standard Operating Procedures and/or Mitigation Measures

The BLM will closely analyze areas proposed for drilling in APDs during the onsite inspection, since regional wetland inventories often do not capture small wetlands. USEPA requires that Storm Water Pollution Prevention Plans and SPCCP be in place to prevent any spill from reaching surface water due to rain events or accidental release of fluids related to production operations.

4.9.2 Ground Water Resources

4.9.2.1 Proposed Action

Groundwater can be affected by multiple factors, including industrial, domestic, or agricultural activities through withdrawal, injection (including chemical injection), or mixing of materials from different geologic layers or the surface. Withdrawal of groundwater could affect local groundwater flow patterns and create changes in the quality or quantity of the remaining groundwater. Loss of a permitted source of groundwater supply due to drawdown would be considered a significant impact if it were to occur and any potential for this to occur would be assessed at the development stage should development be proposed. The drilling of horizontal wells, versus directional and vertical wells may initially appear to require a greater volume of water for drilling/completion purposes. However, a horizontal well develops a much larger area of the reservoir than a directional and/or vertical well and actually results in a lesser volume of fluids being required. Vertical and directional wells can easily require one well per 10 acres resulting in 64 wells per section. This is in contrast to one horizontal well per 640 acres or one per 320 acres which results in a net decrease in total fluid volumes needed and in surface disturbance acreages. Impacts to the quality of groundwater from future development, should they occur, would likely be limited to near a well bore location due to inferred groundwater flow conditions in the area of the parcel.

Oil and gas contained in geologic formations is often not under sufficient hydraulic pressure to flow freely to a production well. The formation may have low permeability or the area immediately surrounding the well may become packed with cuttings. A number of techniques are used to increase or enhance the flow. One such technique is acid introduction to dissolve the formation matrix and create larger void space(s). The use of flow enhancement techniques and secondary recovery methods result in physical changes to the geologic formation that will affect the hydraulic properties of the formation. Typically, the effects of these techniques and methods are localized to the area immediately surrounding the individual well, are limited to the specific oil and gas reservoir, and do not impact adjacent aquifers.

Contamination of groundwater could occur without adequate cementing and casing of a well bore. For fluid to escape the wellbore and affect the usable quality water or contaminate or cross contaminate aquifers, the fluid would have to breech several layers of steel casing and cement. Failure of the cement or casing surrounding the wellbore is a possible risk to water supplies. If the annulus is improperly sealed, natural gas, and formation water containing high concentrations of dissolved solids may be transferred directly along the outside of the wellbore among the target formation, drinking water aquifers, and layers of rock in between. Complying with BLM and state regulations regarding casing and cementing, implementing BMPs, testing casings and cement prior

to continuing to drill or introducing additional fluids and continual monitoring during drilling, allow producers and regulators to check the integrity of casing and cement jobs and greatly reduce the chance of aquifer contamination.

Casing specifications are designed and submitted to the BLM. The BLM independently verifies the casing program, and the installation of the casing and cementing operations are witnessed by a Petroleum Engineer. Petroleum products and other chemicals used in the drilling and/or completion process could result in groundwater contamination through a variety of operational sources including but not limited to pipeline and well casing failure, well (gas and water) construction, and spills. Similarly, improper construction and management of reserve and evaporation pits could degrade ground water quality through leakage and leaching.

The potential for negative impacts to groundwater caused from completion activities have not been confirmed but are not likely. Authorization of the proposed project would require full compliance with local, state, and federal directives and stipulations that relate to surface and groundwater protection and the BLM would deny any APD who proposed drilling and/or completion process was deemed to not be protective of usable water zones as required by 43 CFR 3162.5-2(d).

A high risk of fluid migration exists along the vertical pathways created by inadequately constructed wells and unplugged inactive wells. Brine or hydrocarbons can migrate to overlying or underlying aquifers in such wells. Since the 1930s, most States have required that multiple barriers be included in well construction and abandonment to prevent migration of injected water, formation fluids, and produced fluids. These barriers include (1) setting surface casing below all known aquifers and cementing the casing to the surface, and (2) extending the casing from the surface to the production or injection interval and cementing the interval. Barriers that can be used to prevent fluid migration in abandoned wells include cement or mechanical plugs. They should be installed (1) at points where the casing has been cut, (2) at the base of the lowermost aquifer, (3) across the surface casing shoe, and (4) at the surface. Individual States, and the BLM have casing programs for oil and gas wells to limit cross contamination of aquifers.

Impacts of water use for oil and gas development and production depend on local water availability and competition for water from other users. Overall, impacts range from declining water levels at the regional or local scales and related decreases in base flow to streams (Nicot & Scanlon, 2012). If surface water is used, there could be a temporary decrease in the source's water levels depending upon the conditions at the time of withdrawal. The time it takes to return to baseline conditions is dependent on the amount of rainfall received and other competing uses of the resource.

Typically when groundwater is used as a source of drilling/completion water, impacts to the aquifer would be minimal due to the size of the aquifers impacted and recharge potential across the entire aquifer. However, localized aquifer effects could be expected depending upon the rate of drawdown and the density and/or intensity of the drilling activity. A cone of depression may occur in the immediate vicinity of the existing water well used to supply the drilling water. With each rain event, the aquifer is expected to recharge to some degree, but it is unknown if or when it would recharge to baseline conditions after pumping ceases which is dependent upon surface conditions (whether impervious surface or not). The time it takes depends greatly on rainfall events, surface soil materials, drought conditions, and frequency of pumping that has already

occurred and will continue to occur into the future. The amount of water actually used for drilling/completion activities is highly dependent on a number of factors including: length of well bore, closed-loop or reserve pit drilling system, type of mud, whether hydraulic fracturing would be used during stimulation, whether recycled water would be used, dust abatement needs, and type and extent of construction, to name a few. The impacts of water use on water quality and quantity would be analyzed in more detail during the APD review.

Any proposed drilling/completion activities would need to comply with Onshore Order #2, 43 CFR 3160 regulations, and not result in a violation of a federal and/or state law. If these conditions were not met, the proposal would be denied.

4.9.2.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcel would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease area.

4.9.2.3 Possible Future Best Management Practices, Standard Operating Procedures and/or Mitigation Measures

The BLM recommends that fluid impermeable containment systems (i.e. liners, dikes, berms) be placed in, under and/or around any tank, pit, drilling cellar, ditches associated with the drilling process, or other equipment that use or has the potential to leak/spill hazardous and non-hazardous fluids, to prevent chemicals from penetrating the soil and impacting the aquifer or from moving off-site to a surface water source.

4.10 Wetlands/Riparian Areas/Floodplains

4.10.1 Proposed Action

While the act of leasing federal minerals would produce no direct impacts to wetland/riparian areas/floodplains, this area could be adversely impacted by subsequent mineral development (drilling, production, et.) by changing the water quality or quantity (chemical spills, storm water runoff, etc.). EOI #2277 lies within the Mississippi River alluvial floodplain and is located adjacent to Bayou Cutoff. All anticipated surface disturbance during future oil and gas production development would occur within the larger, state-determined drilling and production unit area but not on the lease parcel itself. Potential effects to these areas are the same as those described in Section 4.9.1, Surface Water.

4.10.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcel would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease area.

4.11 Invasive/Exotic Species

4.11.1 Proposed Action

While the act of leasing federal minerals would not contribute to the spread or control of invasive or non-native species, subsequent exploration/development may. Any surface disturbance could establish new populations of invasive non-native species, although the probability of this happening cannot be predicted using existing information. Noxious weed seeds can be carried to and from the project areas by construction equipment, the drilling rig and transport vehicles. At the APD stage, BLM requirements for use of weed control strategies would minimize the potential for the spread of these species.

4.11.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcel would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease area.

4.11.3 Possible Future Best Management Practices, Standard Operating Procedures and/or Mitigation Measures

Specific mitigation measures would be identified at the APD stage once site-specific development plans are determined. BMPs require that all federal actions involving surface disturbance or reclamation take reasonable steps to prevent the introduction or spread of noxious weeds, including requirements to use weed-free hay, mulch and straw. A BLM COA as well as a Lease Notice (Appendix A) applies to all APDs, should federal minerals be accessed, which recommends that native cover plants in seeding mixtures be used during reclamation activities. Post-construction monitoring for cogon grass and other invasive plant species should be conducted to ensure early detection and control. If invasive species are found, the proper control techniques should be used to either eradicate the species from the area or minimize its spread to other areas. If cogon grass is found on site, equipment should be washed before exiting the site to prevent the spread of this highly invasive species to other locations.

4.12 Vegetation and Wildlife

4.12.1 Proposed Action

There would be no direct impacts to vegetation and wildlife from leasing, since there is no surface disturbance at this stage; however, reasonably foreseeable oil and gas development could result in short and long term impacts to vegetation and wildlife on EOI #2277. All anticipated surface disturbance during future oil and gas production development would occur within the larger, state-determined drilling and production unit area but not on the lease parcel itself.

Short-term impacts to vegetation from future development would primarily result from removal of vegetation for construction of well pads and associated infrastructure. Long-term vegetation loss

could include those portions of the well pad needed for production operations for the life of the well and access road.

Impacts to wildlife could result from increased habitat fragmentation, noise, or other disturbance during development. Although reclamation and restoration efforts for surface disturbance could provide for the integrity of other resources, these efforts may not always provide the same habitat values (e.g. structure, composition, cover, etc.). Short-term negative impacts to wildlife would occur during the construction and production phase of the operation (drilling, fracturing, production, etc.) due to noise and habitat destruction. In general, most wildlife species would become habituated to the new facilities. For other wildlife species with a low tolerance to activities, the operations on the well pad would continue to displace wildlife from the area due to ongoing disturbances such as vehicle traffic, noise and equipment maintenance. The magnitude of above effects would be dependent on the rate and location of the oil and gas development, but populations could likely not recover to pre-disturbance levels until the activity was completed and vegetative community restored.

Many of the common species expected to occur on the lease parcel have broad habitat requirements and would continue to be found in a variety of habitats in the surrounding areas. Wildlife use of the site after the well is put into production would vary depending on vegetation and succession stage. Once put into production, the well pad would be reduced in size and the reserve pit would be graded and seeded. The producing well site would be subject to regular maintenance and inspection. Wildlife use of the site is dependent on the adequacy of restoration. However, over the life of the well, some of the acreage would be excluded from utilization by most wildlife species.

4.12.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcel would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease area.

4.12.3 Possible Future Best Management Practices, Standard Operating Procedures and/or Mitigation Measures

Measures would be taken to prevent, minimize, or mitigate impacts to fish and wildlife animal species from exploration and development activities. Prior to authorization, activities would be evaluated on a case-by-case basis, and the project would be subject to mitigation measures. Mitigation could potentially include rapid re-vegetation, noise restrictions, project relocation, or pre-disturbance wildlife species surveying.

A standard BLM COA and Lease Notice for Perching and Nesting Birds and Bats (Appendix A) would apply at the APD stage that is designed to prevent bat and bird mortality, should federal minerals be accessed. The COA states that all open vent stack equipment, such as heater-treaters, separators, and dehydrator units, will be designed and constructed to prevent birds and bats from entering or nesting in or on such units, and to the extent practical, to discourage birds from perching

on the stacks. Installing cone-shaped mesh covers on all open vents is one suggested method. Flat mesh covers are not expected to discourage perching and will not be acceptable.

4.13 Special Status Species

4.13.1 Proposed Action

There would be no direct impacts to special status species from leasing, since there is no surface disturbance at this stage; however, reasonably foreseeable oil and gas development could result in short and long-term impacts to federally listed species within the larger, state-determined drilling and production unit area containing EOI #2277. Table 4-1 list BLM effect determinations for these species and rationale for those determinations.

Table 4-1. BLM effect determinations for species documented by USFWS to occur in LaFourche Parish, Louisiana.

Species	Federal Status	Determination	Rationale
West Indian Manatee (*Trichechus manatus*)	Threatened	No effect	No suitable habitat present
Piping Plover (*Charadrius melodus*)	Threatened; Critical Habitat	No effect	No suitable habitat present
Red Knot (*Calidris canutus rufa*)	Threatened	No effect	No suitable habitat present
Atlantic Sturgeon (*Acipenser oxyrinchus*)	Threatened	No effect	No suitable habitat present
Green Sea Turtle (*Chelonia mydas*)	Threatened	No effect	No suitable habitat present
Hawksbill Sea Turtle (*Eretmochelys imbricata*)	Endangered	No effect	No suitable habitat present
Kemps Ridley Sea Turtle (*Lepidochelys kempii*)	Endangered	No effect	No suitable habitat present
Leatherback Sea Turtle (*Dermochelys coriacea*)	Endangered	No effect	No suitable habitat present
Loggerhead Sea Turtle (*Caretta caretta*)	Threatened	No effect	No suitable habitat present

On EOI #2277 in LaFourche Parish, Louisiana, there is no suitable habitat for the West Indian manatee, piping plover, red knot, Atlantic sturgeon, green sea turtle, hawksbill sea turtle, Kemps Ridley sea turtle, leatherback sea turtle, and loggerhead sea turtle. BLM has determined that reasonably foreseeable oil and gas development would have no effect on these species due to a lack of suitable habitat.

Threatened and endangered species may be disturbed during construction, drilling, or hydraulic fracturing operations, as these activities involve many vehicles, mobile and non-mobile heavy equipment, and numerous noise-producing equipment (i.e. generators, compressors). The most significant impacts would be limited to the construction, drilling, and completion/stimulation phases, which can span from several weeks to several months and is entirely dependent on the size and extent of new surface disturbance, length of the well bore, or formations encountered during drilling just to name a few factors. During production, impacts from noise and human disturbance would greatly diminish with time. In general, most wildlife species would become habituated to the disturbances. For other wildlife species with a low tolerance to activities, the operations on the well pad would continue to displace wildlife from the area due to ongoing disturbances such as

vehicle traffic from inspectors and semi-trucks hauling produced fluids, noise from compressors and/or a pump-jack if needed, and equipment maintenance. These impacts would last for the life of the well.

Activities associated with oil and gas production that could occur from development on the proposed lease could result in decreased use of this site by threatened and endangered species. Human noise and activity associated with production could cause wildlife to move elsewhere. In addition, a decrease in available habitat due to construction of well pads and access roads could also cause wildlife to move to surrounding areas. Reclamation of well pads could allow for species to use the sites again as long as reclamation creates similar habitats to what was originally there. In short, cumulative impacts associated with continued oil and gas development in the area could include displacement of threatened and endangered species to surrounding areas or a decrease in population viability if suitable habitat is not available in the surrounding area. However, mitigation measures as described below will minimize potential affects that could occur from development within the state-determined drilling and production unit containing the proposed parcel.

4.13.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcel would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease area.

4.13.3 Possible Future Best Management Practices, Standard Operating Procedures and/or Mitigation Measures

A BLM stipulation regarding rare species applies to this proposal. The BLM stipulation states that the BLM may recommend modifications to exploration and development proposals to further the conservation and management objectives for threatened, endangered, or other special status plant or animal species or their habitat to avoid BLM-approved activity that would contribute to a need to list such a species or their habitat. To protect threatened, endangered, candidate, proposed, and BLM sensitive plant species, a second stipulation applies to this lease. The stipulation states that all suitable special status plant species habitat will be identified during environmental review of any proposed surface use or activity. If field examination indicates that habitat of one or more of these species is present, the BLM will require a survey by a qualified botanist for special status plants during periods appropriate to each species. Operations will not be allowed in areas where sensitive plants would be affected.

4.13.4 Informal Consultation

BLM has determined that the proposed project will have no effect on the West Indian manatee, piping plover, red knot, Atlantic sturgeon, green sea turtle, hawksbill sea turtle, Kemps Ridley sea turtle, leatherback sea turtle, and loggerhead sea turtle on EOI #2277 located in LaFourche Parish, due to a lack of suitable habitat on the proposed project site.

Informal consultation with USFWS, Louisiana Ecological Services Office (LESO) was initiated on January 19, 2018. A stamped signature of concurrence on the first page of the consultation document was received on February 16, 2018 and is located in Appendix B.

There is no statutory requirement for USFWS to concur with a "no effect" determination so the LESO provided no additional comments or concerns regarding the West Indian manatee, piping plover, red knot, Atlantic sturgeon, green sea turtle, hawksbill sea turtle, Kemps Ridley sea turtle, leatherback sea turtle, and loggerhead sea turtle on EOI #2277 located in LaFourche Parish.

Because no surface disturbance is authorized and any surface disturbance would be addressed under a separate consultation, the USFWS concurred with the BLM determinations. Informal consultation will be initiated at the APD stage if it is found that there is suitable habitat for any of the species above at the specific project site.

4.14 Migratory Bird Species of Concern

4.14.1 Proposed Action

While the act of leasing would not affect migratory birds, subsequent exploration/development of the subject parcels may produce impacts. Surface disturbance from the development of well pads, access roads, pipelines, and utility lines can result in an impact to migratory birds and their habitat.

USFWS estimates that many migratory birds are killed annually throughout the U.S. in oil field production skim pits, reserve pits, and centralized oilfield wastewater disposal facilities. Numerous grasshoppers, moths, June bugs, and the like become trapped on the surface in tanks and on pits, and become bait for many species of migratory birds. Open tanks and pits then become traps to many species of birds protected under the MBTA. Properly covered tanks and pits (and regularly inspected covered tanks and pits) is imperative to the continued protection of migratory birds in the well pad area.

4.14.2 No Action Alternative

Under the No Action Alternative, the proposed lease parcel would not be made available for lease. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease area.

4.14.3 Possible Future Best Management Practices, Standard Operating Procedures and/or Mitigation Measures

Per the Memorandum of Understanding between BLM and USFWS, entitled, "To Promote the Conservation of Migratory Birds," the following temporal and spatial conservation measures must be implemented as part of the COAs with an APD:

1. Avoid any take of migratory birds and/or minimize the loss, destruction, or degradation of migratory bird habitat while completing the proposed project or action.

2. If the proposed project or action includes a reasonable likelihood that take of migratory birds will occur, then complete actions that could take migratory birds outside of their nesting season. This includes clearing or cutting of vegetation, grubbing, etc. The primary nesting season for migratory birds varies greatly between species and geographic location, but generally extends from early April to mid-July. However, the maximum time period for the migratory bird nesting season can extend from early February through late August. Strive to complete all disruptive activities outside the peak of migratory bird nesting season to the greatest extent possible.
3. If no migratory birds are found nesting in the proposed project or action areas immediately prior to the time when construction and associated activities are to occur, then the project activity may proceed as planned.

To protect perch and roosting sites and terrestrial habitats for and to avoid potential impacts to migratory birds, the following standard BLM COAs would apply at the APD stage, should federal minerals be accessed:

- Any reserve pit that is not closed within 10 days after a well is completed and that contains water must be netted or covered with floating balls, or another method must be used to exclude migratory birds

- All power lines must be built to protect raptors and other migratory birds, including bald eagles, from accidental electrocution, using methods detailed by the Avian Power Line Interaction Committee (APLIC)

4.15 Public Health and Safety

There would be no direct impacts to public health and safety from leasing, since leasing is an administrative action. Public health and safety considerations associated with potential future oil and gas development include potential effects from air emissions, potential exposure to contamination, and increased truck traffic. BLM acknowledges that if the leasing area were to be developed in the future, environmental hazards of exploration, production or extraction of oil and gas may produce some effects to public health or safety if not properly managed. Areas of intense oil and gas development pose public health and safety risks, especially when industrial traffic and hazardous materials are present. For an environmental hazard to pose a risk to public health, a vulnerable human population must first come into contact or be exposed to the hazard. Therefore, communities or workforce residing or working near the potential development sites may be at higher risk for accidental spills, fugitive emissions or releases of gas from a future well bore. The level of effect would depend on the product released or spilled, level of activity, density of development, technological and safety controls/regulations in place, and the receptors' susceptibility to risk.

As of 2014, most studies addressing the public health implications of oil and gas development have been either predictive and/or descriptive hypothesis generating. The few analytic studies are preliminary and do not provide enough evidence to conclusively determine if oil and gas operations directly result in health effects in nearby populations. Existing studies have provided evidence that hazards are inherently present in and around oil and gas operations and populations can be exposed to these hazards if safety measures are not implemented. People living near oil and

gas operations have reported that oil and gas operations affect their health and quality of life, particularly through traffic accidents, air and water pollution, and social disruption expressed as psychosocial stress (University of Colorado at Boulder, 2015). Some short-term health effects reported by people living near oil and gas operations include irritation of the eyes, nose, throat, lungs or skin, or other symptoms like headache, dizziness or nausea and vomiting. Some also report sleep disturbance or anxiety associated with noise or light effects from mineral development activities. There is very little information about long-term health effects in people living near oil and gas operations. The amount of scientific literature connections between oil and gas related exposures and a health effect is currently limited but is growing (Colorado Department of Public Health and Environment (CDPHE), 2016).

One of the primary ways in which the public could be exposed to pollutants associated with potential future oil and gas operations is through the air. There is also the possibility of exposure through surface water, groundwater or soil, but this is much less likely under normal operating conditions due to the numerous safety protocols implemented by oil and gas operations (CDPHE, 2016). Numerous scientific studies have linked air pollution to a variety of health problems including: (1) respiratory and cardiovascular disease, (2) decreased lung function, (3) increased frequency and severity of respiratory symptoms such as difficulty breathing and coughing, (4) increased susceptibility to respiratory infections, (5) effects on the nervous system, including the brain, such as IQ loss and impacts on learning, memory, and behavior, (6) cancer, and (7) premature death. Sensitive individuals or those at high risk appear to be at even greater risk for air pollution-related health effects, for example, those with pre-existing heart and lung diseases (e.g., heart failure/ischemic heart disease, asthma, emphysema, and chronic bronchitis), diabetics, older adults, and children. Future mineral development operations on this lease parcel that would violate a state and/or federal air quality standard would not be approved.

Future mineral development within this lease parcel would likely result in a minor increase in truck traffic, noise, and potential visual and light pollution effects. As discussed throughout this EA, potential effects from possible future oil and gas operations on the lease parcels would be minimized through the application of best management practices, standard operating procedures, and potential mitigations.

4.16 Transportation

Leasing minerals within the proposed parcel would not result in any direct impacts to the existing transportation network in the vicinity of the site since there would be no ground disturbance associated with leasing. Potential impacts to existing roads and traffic patterns may occur, however, from future mineral development. All anticipated surface disturbance during future development would occur within the larger, state-determined drilling and production unit area but not on the lease parcel itself. As discussed in the RFDS for this parcel, access roads may be needed to support future oil and gas development. Adequate access to a well can be provided by:

- Using existing roads, some of which may need upgrading;
- Constructing a new road; or/and
- A combination of both.

Heavy vehicles may cause paved roads in the vicinity of the lease parcel to crack, or deteriorate, especially along the edges of the narrower roadways. Gravel and dirt roads may be subject to the formation of ruts, potholes, and washboard effects. The level of impact is dependent upon the amount of activity, weather conditions during the activity and the level of road maintenance. The greatest effects would likely occur for a relatively short duration during the drilling and plugging phases of future oil and gas operations which usually require the use of heavy vehicles and equipment.

Future mineral development within the state-determined drilling and production unit containing the proposed lease parcel would likely result in a minor increase in truck traffic to the area, resulting in a slight increase in risk of potential collisions with wildlife crossing the roads, such as the white-tailed deer. Increased particulate matter in the form of dust from vehicular traffic would impair visibility, decrease potential browsing, pollinating, and nesting for wildlife, and impair vegetative growth on the edges of unimproved roadways. Effects to traffic patterns on the nearby road system may vary depending on the location(s) of the future well(s) and the time of day the roads are used. Increases in vehicle traffic associated with potential future mineral development may result in periodic traffic-related inconveniences. An increase in truck traffic may also increase the risk of potential traffic-related accidents. After exploration and drilling, the vehicle traffic would decline but would still be subject to the occasional need for vehicle access to the well site.

4.17 Cumulative Effects

CEQ regulations stipulate that the cumulative effects analysis within an EA should consider the potential environmental impacts resulting from 'the incremental impacts of the action when added to past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions" (40 CFR 1508.7). Recent CEQ guidance in considering cumulative effects involves defining the scope of the other actions and their interrelationship with the Proposed Action. The scope must consider geographical and temporal overlaps among the Proposed Actions and other actions. It must also evaluate the nature of interactions among these actions.

Cumulative effects are most likely to arise when a relationship or synergism exists between the Proposed Action and other actions expected to occur in a similar location or during a similar time period. Actions overlapping with or in proximity to the Proposed Action would be expected to have more potential for a relationship than those more geographically separated.

To identify cumulative effects, three fundamental questions need to be addressed:

- Does a relationship exist such that affected resource areas of the Proposed Action might interact with the affected resource areas of past, present, or reasonably foreseeable actions?

- If one or more of the affected resource areas of the Proposed Action and another action could be expected to interact, would the Proposed Action affect or be affected by impacts of the other action?

- If such a relationship exists, then does an assessment reveal any potentially significant impacts not identified when the Proposed Action is considered alone?

The scope of the cumulative effects analysis involves both the geographic extent of the effects and the time frame in which the effects could be expected to occur. For this EA, the affected area includes the proposed lease area and surrounding vicinity.

4.17.1 Context for Cumulative Effects Analysis

Offering the subject parcel for lease, and the subsequent issuance of the lease, in and of itself, would not result in any cumulative impacts; however, the Proposed Action does include an analysis of the potential reasonably foreseeable oil and gas development that could occur in the future associated with the lease parcel, which serves as the basis for assessing whether there could be any cumulative effects associated with the possible future development of the lease parcel. The 5.56 acres of federal mineral estate could potentially add 1 or more vertical wells from 1 well pad if the parcel is leased and developed. The well pad would be located not on the parcel itself but within the nearby larger, state-determined drilling and production unit.

4.17.2 Cumulative Effects Analysis

The area surrounding EOI #2277 in LaFourche Parish has been moderately drilled for natural gas well development activity. According to LDNR records, one hundred thirty-three (133) wells have been placed in T.15S., R.16E.; however, recent activity has been sparse – no wells have been drilled in more than seven (7) years.

The incremental effect of the Proposed Action and No Action Alternative in combination with other past, present, or reasonably foreseeable actions on resources including land use, visual/noise resources, vegetation and wildlife (including invasives and migratory birds), soil resources, cultural resources, water resources, soils, and wastes is relatively minor. Further site-specific NEPA analysis will be conducted at the APD stage, along with additional consultations and surveys as required. Further NEPA analysis at the APD stage will address cumulative impacts of any proposed development at the site-specific level; however, this EA does discuss cumulative impacts from leasing on a general level. Following is a discussion of potential cumulative effects associated with the Proposed Action and No Action Alternative.

Land Use

There would be no cumulative impacts to land use as a result of leasing EOI #2277; however, the RFD scenario projects approximately 6.97 acres of surface disturbance associated with reasonably foreseeable development from potential future oil and gas activities. All anticipated surface disturbance during future development would occur within the larger, state-determined drilling and production unit area but not on the lease parcel itself. The area surrounding EOI #2277 is largely rural with minimal development. Other activities occurring in the area include agriculture and aquaculture, which over time may contribute to changes in existing land uses if these activities are changed or expanded. Potential future development associated with the leasing of EOI #2277 would contribute minimally to land use conversion in the area and is consistent with ongoing uses

of the land in the general vicinity of the proposed lease parcel. Therefore, there would be no perceptible cumulative impacts to land use from implementing the Proposed Action and No Action Alternative.

Visual/Noise Resources

There would be no cumulative impacts to visual and noise resources as a result of leasing EOI #2277 in LaFourche Parish, Louisiana. The RFD scenario projects approximately 6.97 acres of surface disturbance associated with reasonably foreseeable development from potential future oil and gas activities. All anticipated surface disturbance during future development would occur within the larger, state-determined drilling and production unit area but not on the lease parcel itself. Because the area surrounding EOI #2277 in LaFourche Parish is largely rural with minimal development, there are few noise-generating activities in the area above and beyond those typical of a rural, agricultural area. Agriculture activities typically do not produce noise levels that would result in noise ordinance violations. Because the other activities in the area are spatially separated, the Proposed Action and No Action Alternative would not result in a cumulative impact to the noise or visual environment.

Cultural Resources and Native American Concerns

There would be no cumulative impacts to cultural resources as a result of leasing EOI #2277; however, potential cumulative effects to cultural resources could occur if future development activities on or near the parcel are conducted without proper surveys and consultations under the NHPA or state requirements. All anticipated surface disturbance during future development would occur within the larger, state-determined drilling and production unit area but not on the lease parcel itself. Cumulative effects from repetitious illegal activity, primarily archeological vandalism, may occur on certain sites or site types unless perpetrators are apprehended and prosecuted. The degree of cumulative effects to known properties from BLM activities, however, should be slight as inventory, assessment, protection, and mitigation measures would be implemented at the APD stage if federal minerals are accessed. Under the No Action Alternative, operators in the vicinity would be required to comply with all required laws and regulations with regard to protection of cultural resources and Native American Concerns.

Socioeconomics and Environmental Justice

Cumulative effects to socioeconomics from reasonably foreseeable future development would likely be positive, but minor. At this time, it is not possible to determine with certainty the magnitude and duration of potential impacts either in terms of payments received or changes in employment patterns in LaFourche Parish. Additional analysis will be conducted at the APD stage where socioeconomic impacts will be further assessed. Many of the cumulative socioeconomic effects and impacts associated with oil and gas development are already occurring in the region and would be perpetuated in the future. For instance, oil and gas activity is generating employment opportunities and labor earnings for communities that support these types of activities.

The Proposed Action and No Action Alternative would not disproportionately affect low income or minority populations; therefore, there would be no cumulative effects to these groups.

Soils

Increases in mineral development, construction activities, and the conversion of land to developed landscapes collectively result in the removal of vegetation, long-term reduction in vegetation cover, and disturbance of soils. This would expose soils to the erosive forces of wind and water, destabilize soils, and increase overland flow, which in turn could result in accelerated erosion. Accelerated erosion could mobilize soils and remove nutrient-rich topsoil, and thereby reduce soil productivity and vegetation growth rates. The incremental effect of the Proposed Action and No Action Alternative with other activities on soils in the vicinity would be small. Cumulative impacts to soil resources would therefore be negligible.

Mineral Resources

There would be no cumulative impacts to minerals from the administrative action of leasing the EOI #2277, but the potential reasonably foreseeable development projected under the RFD scenario in combination with other mineral development activities in the area would result in a minor incremental effect from development on BLM federal mineral estate. All anticipated surface disturbance during future development would occur within the larger, state-determined drilling and production unit area but not on the lease parcel itself. At this stage it is uncertain how productive the well accessing the federal mineral estate would be, should development occur in the future. If developed, the mineral resources would be drained and depleted over time.

Wastes

As noted in the Proposed Action description, impacts from waste storage, handling, and disposal would be minimized through the use of BMPs, SOPs, and COAs at the APD stage, should federal minerals be proposed for development. Other mineral development, agriculture, and timber management activities in the area would need to comply with all required laws and regulations with regard to wastes. Therefore, cumulative effects from wastes are not anticipated.

Natural Resources (Vegetation and Wildlife, Special Status Species, Invasive Species, Migratory Birds)

The Proposed Action and No Action Alternative would contribute a minor amount of potential vegetation loss from reasonably foreseeable development. Under the RFD scenario, approximately 6.97 acres of surface disturbance could occur from future oil and gas activities associated with EOI #2277. All anticipated surface disturbance during future development would occur within the larger, state-determined drilling and production unit area but not on the lease parcel itself. The loss of vegetation would also affect wildlife using that habitat, although many species would likely relocate during construction from future development activities. Reclamation activities would help restore vegetation conditions. Future site-specific analysis would be conducted at the APD stage. Cumulative effects to vegetation, wildlife, special status species, and migratory birds would be minor and cumulative effects to the population level of species are not expected. The Proposed Action would not be expected to significantly compound current patterns of habitat fragmentation, degradation, or wildlife patterns. If BLM weed control strategies are implemented, cumulative effects due to invasive species are not anticipated.

Water Resources (Surface and Ground Water, Floodplains, Riparian Areas, and Wetlands)

There would be no cumulative impacts to water resources from the administrative action of leasing EOI #2277, however, energy and mineral development, construction activities, forestry, agriculture, and the conversion of land to developed landscapes, collectively results in the removal of vegetation, long-term reduction in overall vegetation cover, and disturbance of soils. This would increase overland flow, result in accelerated soil erosion, and decrease the ability of watersheds to buffer high flows and filter water, sediment, and nutrients. Soil mobilized by wind and water erosion would be transported downslope and to nearby water bodies, which would increase sediment and nutrient loads to streams, rivers, lakes, and reservoirs and thereby degrade water quality. Increases in overland flow also would directly increase the amount of water transported to streams and rivers, which could lead to increased downcutting, widening, and overall degradation of stream channels. The incremental effect of the Proposed Action and No Action Alternative would result in negligible cumulative effects to surface water.

Oil and gas wells have the potential to affect groundwater quality and quantity through withdrawal, injection, and unintentional leakage and spills. Proper well design, construction, drilling, and completion methods would reduce the likelihood of these impacts but would not entirely eliminate them. Contamination of groundwater could occur without adequate cementing and casing of the proposed well bore. For completion or formation fluids to escape the wellbore and affect the usable quality water or contaminate or cross contaminate aquifers, the fluid would have to breech several layers of steel casing and cement. Failure of the cement or casing surrounding the wellbore is a possible risk to water supplies. If the annulus is improperly sealed, natural gas, and formation water containing high concentrations of dissolved solids may be transferred directly along the outside of the wellbore among the target formation, drinking water aquifers, and layers of rock in between. Complying with BLM and state regulations regarding casing and cementing, implementing BMPs, testing casings and cement prior to continuing to drill or introducing additional fluids and continual monitoring during drilling, allow producers and regulators to check the integrity of casing and cement jobs and greatly reduce the chance of aquifer contamination. Cumulative effects to ground water are not anticipated if SOPs, BMPs, and COAs as described in this EA and identified during the APD process are followed, should federal minerals be proposed for development.

Air Quality

Cumulative effects from potential oil and gas development from the proposed leases and possible future development could be an overall increase in CO, NOx, SO_2, Pb, PM, CO_2, CH_4, and N_2O. However, according to USEPA's Air Trends report for 2011 (USEPA 2011), since 1990, nationwide air quality has improved significantly for the six common air pollutants (Figure 4-1). These six pollutants are ground-level O_3, $PM_{2.5}$, PM_{10}, Pb, NO_2, CO, and SO_2. Nationally, air pollution was lower in 2010 than in 1990 for:

- 8-hour O_3, by 17%
- 24-hour PM_{10} , by 38%
- 3-month average Pb, by 83%

- annual NO_2 , by 45%
- 8-hour CO, by 73%
- annual SO_2 , by 75%

Nationally, annual $PM_{2.5}$ concentrations were 24% lower in 2010 compared to 2001 and 24-hour $PM_{2.5}$ concentrations were 28% lower in 2010 compared to 2001. O_3 levels did not improve in much of the East until 2002, after which there was a significant decline. Eight-hour O_3 concentrations were 13% lower in 2010 than in 2001. This decline is largely due to reductions in NOx required by USEPA rules including the NOx State Implementation Plan (SIP) Call, preliminary implementation of the Clean Air Interstate Rule (CAIR), and Tier 2 Light Duty Vehicle Emissions Standards.

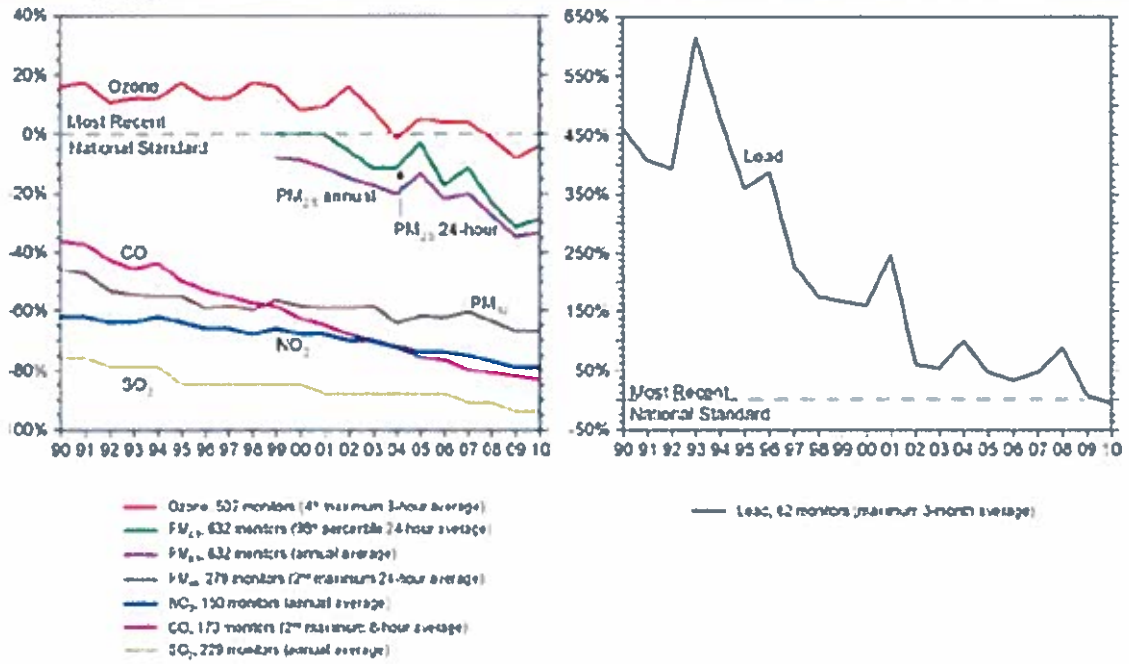

Figure 4-1. Comparison of national levels of the six common pollutants to the most recent NAAQS, 1990-2010. National levels are averages across all monitor stations with complete data for the time period. Note: Air quality data for $PM_{2.5}$ starts in 1999 (USEPA, 2011).

USEPA concludes that total emissions of toxic air pollutants have decreased by approximately 42% between 1990 and 2005. Control programs for mobile sources and facilities such as chemical plants, dry cleaners, coke ovens, and incinerators are primarily responsible for these reductions. They also found that monitored concentrations of toxic pollutants such as benzene, 1,3-butadiene, ethylbenzene, and toluene decreased by 5% or more per year between 2003 and 2010 at more than half of ambient monitoring sites. Other toxic air pollutants of concern to public health such as carbon tetrachloride, formaldehyde, and several metals, declined at most sites.

Climate Change

The administrative action of leasing would not result in any GHG emissions; however, potential future development would likely result in GHG emissions. In October 2012, USEPA regulations

that require control of VOC emissions from oil and gas development became effective. These regulations will reduce VOC emissions from oil and gas exploration and production emissions that contribute to the formation of O_3. Emissions from any lease development are not expected to impact the 8-hour average O_3 concentrations, or any other criteria pollutants in the area of the proposed lease. The Proposed Action would not result in a violation of any NAAQ or criteria pollutant in the area of the proposed lease.

The incremental contribution to global GHGs from the Proposed Action cannot be translated into effects on climate globally or locally, due to the uncertainties associated with ongoing scientific research. When further information on the impact to climate is known, such information would be incorporated in the BLM's planning and NEPA documents as appropriate.

4.18 Irreversible and Irretrievable Commitments of Resources

NEPA Section 102(2)C requires a discussion of any irreversible or irretrievable commitments of resources that would be involved in the proposal should it be implemented. An irreversible commitment of a resource is one that cannot be reversed (e.g., the extinction of a species or disturbance to protected cultural resources). An irretrievable commitment of a resource is one in which the resource or its use is lost for a period of time (e.g., extraction of any solid mineral ore or fluid mineral).

Reasonably foreseeable oil and gas development associated with the Proposed Action would result in a minor amount of surface disturbing activities that would result in irreversible or irretrievable commitments of resources. All anticipated surface disturbance during future development would occur within the larger, state-determined drilling and production unit area but not on the lease parcel itself. These surface disturbing activities would result in alterations to soil, removal of vegetation cover and wildlife habitat, and possible damage to cultural resources if proper surveys and consultations are not conducted under the NHPA. Increases in sediment and nonpoint source pollution that result from these activities could result in degradation of water quality within the watershed and habitat for aquatic-dependent species, although no major surface waters are located adjacent to the parcel. Use of BMPs, SOPs, COAs and stipulations as described in the EA are designed to reduce the magnitude of these impacts by preventing habitat degradation. Development of oil and gas wells would represent an irretrievable commitment of nonrenewable fossil fuels.

4.19 Relationship between Local Short-term Uses and Long-term Productivity

NEPA requires an analysis of the relationship between a project's short-term impacts on the environment and of the effects that these impacts may have on the maintenance and enhancement of the long-term productivity of the affected environment. Impacts that narrow the range of beneficial uses of the environment are of particular concern. This refers to the possibility that choosing one development option reduces future flexibility in pursuing other options, or that giving over a parcel of land or other resource to a certain use eliminates the possibility of other uses being performed at the site.

The Proposed Action would take place within a relatively rural area with minimal development. No unique habitat or ecosystems would be lost due to this action. Implementation of the Proposed Action or No Action Alternative may result in future oil and gas development, which results in surface disturbing and other disruptive activities that remove vegetation, increase soil erosion and compaction, create visual intrusions and landscape alterations, increase noise, and degrade wildlife habitat. Although management actions, BMPs, surface use restrictions, and lease stipulations are intended to minimize the effect of short-term uses, some impact on long-term productivity of resources would occur; however, the level of impact would be minor.

5.0 CHAPTER 5 – LIST OF PREPARERS

Key Personnel included:

Jason Ross, Planning and Environmental Specialist, BLM Eastern States, Southeastern States District Office

Alison McCartney, Planning and Environmental Coordinator, BLM Eastern States, Southeastern States District Office

John Sullivan, Archeologist, BLM Eastern States, Southeastern States District Office

Bill Bagnall, Petroleum Geologist, BLM Eastern States, Southeastern States District Office

6.0 CHAPTER 5 – REFERENCES

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APPENDIX A: LEASE STIPULATIONS AND NOTICES FOR EOI #2277.

STIPULATIONS

BLM

Cultural Resources and Tribal Consultation

Stipulation: These leases may be found to contain historic properties and/or resources protected under the National Historic Preservation Act (NHPA), American Indian Religious Freedom Act, Native American Graves Protection and Repatriation Act, E.O. 13007, or other statutes and executive orders. The BLM will not approve any ground disturbing activities that may affect any such properties or resources until it completes its obligations under applicable requirements of the NHPA and other authorities. These obligations may include a requirement that you provide a cultural resources survey conducted by a professional archaeologist approved by the State Historic Preservation Office (SHPO). If currently unknown burial sites are discovered during development activities associated with this lease, these activities must cease immediately, applicable law on unknown burials will be followed and, if necessary, consultation with the appropriate tribe/group of federally recognized Native Americans will take place. The BLM may require modification to exploration or development proposals to protect such properties, or disapprove any activity that is likely to result in adverse effects that cannot be successfully avoided, minimized or mitigated.

Endangered Species

Stipulation: The lease areas may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species. BLM may recommend modifications to exploration and development proposals to further its conservation and management objective to avoid BLM-approved activity that will contribute to a need to list such a species or their habitat. BLM may require modifications to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat. BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the Endangered Species Act as amended, 16 U.S.C. ' 1531 et seq., including completion of any required procedure for conference or consultation.

Exception: None

Modification: None

Waiver: None

Sensitive Plant Species

Stipulation (CSU): All suitable special status plant species habitat will be identified during environmental review of any proposed surface use activity. If field examination indicates that

habitat of one or more of these species is present, the BLM will require a survey by a qualified botanist for special status plants during periods appropriate to each species. Operations will not be allowed in areas where sensitive plants would be affected.

Objective: To protect threatened, endangered, candidate, proposed, and BLM sensitive plant species.

Exception: An exception may be granted if the operator agrees to implement measures developed in consultation with USFWS and in coordination with State agencies.
Modification: The stipulation may be modified if it is determined that a portion of the lease area does not contain sensitive plant species habitat.

Waiver: The stipulation may be waived if, based on field surveys, it is determined that the lease area does not contain sensitive plant species habitat.

LEASE NOTICES/BEST MANAGEMENT PRACTICES

Migratory Birds and Federally Listed Wildlife

Objective: To protect perch and roosting sites and terrestrial habitats for and to avoid potential impacts to migratory birds and federally listed wildlife.

Any reserve pit that is not closed within 10 days after a well is completed and that contains water must be netted or covered with floating balls, or another method must be used to exclude migratory birds.
All powerlines must be built to protect raptors and other migratory birds, including bald eagles, from accidental electrocution, using methods detailed by the Avian Power Line Interaction Committee (APLIC 2006)

Perching and Nesting Birds and Bats

Objective: To prevent birds and bats from entering or nesting in or on open vent stack equipment.

Open vent stack equipment, such as heater-treaters, separators, and dehydrator units, will be designed and constructed to prevent birds and bats from entering or nesting in or on such units and, to the extent practical, to discourage birds from perching on the stacks. Installing cone-shaped mesh covers on all open vents is one suggested method. Flat mesh covers are not expected to discourage perching and will not be acceptable.

Invasive and Non-Native Species

Objective: To discourage the spread of invasive, non-native plants.

Use of native or non-invasive plants in seeding mixtures will be encouraged to stabilize disturbed areas and during restoration activities. Construction sites will be surveyed for invasive species prior to ground disturbance. If invasive species are found, the proper control measures will be

used to either eradicate the species from the area or minimize its spread to other areas. If cogongrass is found on site, equipment will be washed before exiting the site to prevent the spread of this highly invasive species to other locations. Post-construction monitoring for cogongrass and other invasive plant species should be conducted to ensure early detection control. In the case of split-estate lands, final seed mixtures will be formulated in consultation with the private landowner.

Pesticide Application

Objective: To protect the water quality of watersheds and natural stream substrate and morphology supporting special status species and their host species.

Any ground application of herbicides or other pesticides, sterilants, or adjuvants within 150 feet of listed species or habitat will require site-specific control measures developed in coordination or formal consultation with USFWS. No aerial application of herbicides or pesticides will be permitted.

APPENDIX B: AGENCY AND TRIBAL CORRESPONDENCE

Sullivan, John <j35sullivan@blm.gov>

BLM RE: EOI 2277 Lafourche Parish

Section106 <Section106@mcn-nsn.gov> Thu, Jan 25, 2018 at 10:12 AM
To: "Sullivan, John" <j35sullivan@blm.gov>

John M. Sullivan, RPA
Southeastern States District
Eastern States Office
State Archaeologist/Tribal Coordinator
Deputy Preservation Officer
411 Briarwood Dr., Suite 404
Jackson MS 39206

Mr. Sullivan:

Thank you for the correspondence regarding the proposed EOI 2277 in Lafourche Parish, LA. Upon closer review of the specific project location, this project does not lie within our area of interest. We respectfully defer to the other Tribes that have been contacted. If you have any further questions or concerns, please give us a call.

Thank You

David J. Proctor

Historic and Cultural Preservation Department, Traditional Cultural Advisor

Muscogee (Creek) Nation

P.O. Box 580 / Okmulgee, OK 74447

T 918.732.7732

F 918.758.0649

DavidP@MCN-nsn.gov

http://www.muscogeenation-nsn.gov/

Federal and state agencies, museums, and consulting partners, as of October 1, 2015 please send all Section 106 project notices as well as all NAGPRA notices to our section 106 email: section106@mcn-nsn.gov. If you have any questions, please give us a call at 918-732-7733.

From: Sullivan, John [mailto:j35sullivan@blm.gov]
Sent: Tuesday, January 23, 2018 4:09 PM
To: RaeLynn Butler; Section106; Corain Lowe
Subject: EOI 2277 Lafourche Parish

Sullivan, John <j35sullivan@blm.gov>

RE: EOI 2277 Lafourche Parish

1 message

Alina Shively <ashively@jenachoctaw.org> Thu, Feb 15, 2018 at 11:25 AM
To: "Sullivan, John" <j35sullivan@blm.gov>

John:

Regarding the above-mentioned property lease, the Jena Band of Choctaw Indians' THPO is not aware of any TCP's on this specific piece of land. However, Cultural Properties are present within a one mile radius; thus, tribal consultation should take place prior to any ground disturbing activities. Thank you.

Sincerely,

Alina J. Shively

Jena Band of Choctaw Indians

Tribal Historic Preservation Officer

P.O. Box 14

Jena, LA 71342

(318) 992-1205

ashively@jenachoctaw.org

Sullivan, John <j35sullivan@blm.gov>

RE: EOI 2277 Lafourche Parish

1 message

Lindsey Bilyeu <lbilyeu@choctawnation.com> Sat, Feb 24, 2018 at 3:22 PM
To: "Sullivan, John" <j35sullivan@blm.gov>

John,

The Choctaw Nation of Oklahoma thanks the BLM for the correspondence regarding the above referenced project. Lafourche Parish lies outside of our area of historic interest. The Choctaw Nation Historic Preservation Department respectfully defers to the other Tribes that have been contacted.

If you have any questions, please contact me.

Thank you,

Lindsey D. Bilyeu, MS

Senior Compliance Review Officer

Historic Preservation Department

Choctaw Nation of Oklahoma

P.O. Box 1210

Durant, OK 74702

580-924-8280 ext. 2631

From: Sullivan, John [mailto:j35sullivan@blm.gov]
Sent: Tuesday, January 23, 2018 4:09 PM
To: Ian Thompson <ithompson@choctawnation.com>; Lindsey Bilyeu <lbilyeu@choctawnation.com>
Subject: EOI 2277 Lafourche Parish

Halito!

WARNING: External email. Please verify sender before opening attachments or clicking on links.

Biological Assessment

This project has been reviewed for effects to Federal trust resources under our jurisdiction and currently protected by the Endangered Species Act of 1973 (Act). The project, as proposed,
( ) will have no effect on these resources
( ) is not likely to adversely affect these resources

Supervisor
Louisiana Ecological Services Office
U.S. Fish and Wildlife Service

Date

Prepared by: Jason Ross
Date: 1/19/2018
Project: Proposed Federal Oil and Gas Lease
Expression of Interest #2277

Introduction

An Expression of Interest (EOI) was submitted to the Bureau of Land Management (BLM), Southeastern States District Office (SSDO) to lease subsurface federal minerals located under privately owned surface (split-estate) on one parcel totaling 5.56 acres in LaFourche Parish, Louisiana.

One parcel, EOI #2277, totaling 5.56 acres is located in LaFourche Parish in southeastern Louisiana within the Mississippi Alluvial Plains ecoregion in the Gulf Coastal Plain physiographic province (Figure 1 in Appendix A), which encompasses all of Louisiana. This region is characterized by broad, flat alluvial plains, river terraces, and associated lower depressions (sloughs, swamps, ponded wetlands, lakes) of the Mississippi River floodplain (Daigle, J.J., et al., USGS 2006). The resulting natural vegetative community is classified as southern floodplain forest; however, the majority of the area is currently cleared under intensive commercial agriculture in the form of cotton (*Gossypium hirsutum*), sugarcane (*Saccharum officinarum*), rice (*Oryza sativa ssp.*), soybeans (*Glycine max*), corn (*Zea mays*) and commercial aquaculture activity (Daigle, J.J., et al., USGS 2006). Where present, bottomland hardwood tree species dominate the overstory canopy while shade and water-tolerant species occupy the mid and understory.

The proposed EOI, if approved, would be offered for competitive lease with stipulations and notices generated through this and other consultations, as well as the National Environmental Policy Act (NEPA) process. The proposed lease would give the lessee exclusive rights to explore and develop oil and gas reserves on the lease, but does not in itself authorize surface disturbing activities. Although there is no surface disturbance at this leasing stage, the BLM NEPA analysis is conducted with the knowledge that there could be disturbance in the future as a result of the initial leasing action. As a result, the NEPA analysis for this EOI addresses potential effects from drilling although drilling will not actually occur at this leasing stage.

For the purposes of this analysis, the BLM assumes that activities at the proposed project site would be implemented at the rate estimated in the Reasonably Foreseeable Development Scenario (RFD). The RFD projects that one vertical well would be drilled from 1 well pad for a total of 6.97 acres disturbed (Appendix C). The proposed pad would be located on Private Surface/Private Minerals (Fee/Fee). There will be no surface disturbance on the parcel. Other wells could be drilled directionally from the original pad if the initial well is productive. Well pad and pit would disturb 6.63 acres. An additional 0.34 acres would be disturbed for access roads. The total estimated disturbance is 6.97 acres. This RFD and BA also assume that approximately 0.34 acres would be reclaimed after well is put in production for a net disturbance of 6.63 acres.

JOHN BEL EDWARDS
GOVERNOR

State of Louisiana
DEPARTMENT OF WILDLIFE AND FISHERIES
OFFICE OF WILDLIFE

JACK MONTOUCET
SECRETARY

Date	March 2, 2018
Name	Jason Ross
Company	DOI, Bureau of Land Management
Street Address	273 Market Street
City, State, Zip	Flowood, MS 39232
Project	BOI 2277
Project ID	
Invoice Number	18030225

Personnel of the Coastal & Nongame Resources Division have reviewed the preliminary data for the captioned project. After careful review of our database, no impacts to rare, threatened, or endangered species or critical habitats are anticipated for the proposed project. No state or federal wildlife refuges, wildlife management areas, or scenic streams are known to occur at the specified site within Louisiana's boundaries.

The Louisiana Natural Heritage Program (LNHP) has compiled data on rare, endangered, or otherwise significant plant and animal species, plant communities, and other natural features throughout the state of Louisiana. Heritage reports summarize the existing information known at the time of the request regarding the location in question. The quantity and quality of data collected by the LNHP are dependent on the research and observations of many individuals. In most cases, this information is not the result of comprehensive or site-specific field surveys; many natural areas in Louisiana have not been surveyed. This report does not address the occurrence of wetlands at the site in question. Heritage reports should not be considered final statements on the biological elements or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments. LNHP requires that this office be acknowledged in all reports as the source of all data provided here. If at any time Heritage tracked species are encountered within the project area, please contact the LNHP Data Manager at 225-765-2643. If you have any questions, or need additional information, please call 225-765-2357.

Sincerely,

for Corey Lynn Perry, Program Manager
Natural Heritage Program

P.O. BOX 98000 • BATON ROUGE, LOUISIANA 70898-9000 • PHONE (225) 765-2800
AN EQUAL OPPORTUNITY EMPLOYER

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Eastern States
Southeastern States District Office
273 Market Street
Flowood, Mississippi 39232
www.blm.gov/eastern-states

IN REPLY REFER TO:
8100 (020) JMS EOI 2277, Lafourche Parish

Jan. 23, 2018

Mr. Phil Boggan, SHPO
Department of Culture, Recreation & Tourism
P.O. Box 44247
Baton Rouge, LA 70804

Dear Mr. Boggan:

The Bureau of Land Management (BLM) has received an Expression of Interest (EOI) 2277 in Lafourche Parish. The proposed pad will be located on private Surface accessing private minerals. Federal minerals cannot be independently developed and will be incorporated into a state determined commissioners or voluntary geological production unit; no fracking will be required in this action.

The Bureau's Reasonably Foreseeable Development (RFD) scenario for the proposed lease is one well from one well pad to be constructed on private surface with no more than 6.63 acres total, access road and pad, to be disturbed accessing these minerals. The legal locations of the approximately 5.56 acres (map enclosed):

Louisiana Meridian
Lafourche Parish (Gray and Thibodaux Quadrangle)
T. 15 S., R.16 E., Sec. 153 (5.56 acres)

Development locations have not been determined on a site-specific basis. The developer and surface owners determine specific locations proposed for development. The BLM's surface responsibilities rest only within the boundaries of any proposed development.

The lease document will state that before the BLM approves any development proposal, a cultural resources survey that meets current professional standards and a report that meets Louisiana Division of Archaeology requirements will be required on a site-specific basis. Both the Louisiana Division of Archaeology and the BLM must approve the report before any ground disturbing activities take place. Any needed consultation will be concluded before ground-disturbing activities begin.

Your concurrence of these procedures for Section 106 compliance is requested in 30 days. If you have any questions or concerns, please contact John M. Sullivan, Archeologist, at (601) 919-4675 or email at jSullivan@BLM.Gov

APPENDIX C: REASONABLY FORSEEABLE DEVELOPMENT

REASONABLY FORESEEABLE DEVELOPMENT SCENARIO

Case File Number: EOI 2277

Project Number:

Acres: 5.56

Location: Louisiana Meridian, Lafourche Parish, T15S-R16E, Sec. 153

I. Reasonably Foreseeable Development

A. RFD Baseline Scenario Assumptions and Discussion

Objective horizons are multiple, stacked sands of middle Miocene age. The commodity is natural gas and crude oil with other associated liquid hydrocarbons.

The Federal minerals are located on the west edge of Rousseau Field. For that reason, both the oil and gas occurrence and oil and gas development potential are moderate.

Federal acreage with be incorporated into a state determined commissioners or voluntary geological based drilling and production unit, each of variable size in acres.

Interest in the Federal lands indicates that there could be multiple wells drilled in the prospect area. Wells are vertically or directionally drilled with a slight offset and DO NOT REQUIRE FRACKING. Drilling and completion time is approximately 6 weeks.

Project one (1) 16,500' well to be drilled from one (1) well pad. The proposed pad with be located on Private Surface/Private Minerals (Fee/Fee). Other wells could be drilled directionally from the original pad if the initial well is productive.

A 30' wide well access road will be constructed consisting of a 16' wide travel surface with a 7' buffer on each side.

If productive, oil and gas handling and production facilities will be constructed on the existing pad.

If productive, the reserve pit and part of the drill pad will be reclaimed when drilling and completion activities are concluded.

All disturbed acreage will be reclaimed if the well is non-productive.

B. Surface Disturbance Due to Oil and Gas Activity

Access Road: 0.34 acres (500' X 30')

Well Pad & Pit: 6.63 acres (550' X 525')

Utility and/or Pipeline R.O.W: 0 acres. Use access road ROW

Initial Disturbance: 6.97 acres

Partial Reclamation of Drill Site: 0.34 (Reserve Pit 150' X 100')

Net Disturbance for Productive Well: 6.63 acres